

**MASTER
NEGATIVE
NO.94-82107-3**

COPYRIGHT STATEMENT

The copyright law of the United States (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted materials including foreign works under certain conditions. In addition, the United States extends protection to foreign works by means of various international conventions, bilateral agreements, and proclamations.

Under certain conditions specified in the law, libraries and archives are authorized to furnish a photocopy or other reproduction. One of these specified conditions is that the photocopy or reproduction is not to be "used for any purpose other than private study, scholarship, or research." If a user makes a request for, or later uses, a photocopy or reproduction for purposes in excess of "fair use," that user may be liable for copyright infringement.

The Columbia University Libraries reserve the right to refuse to accept a copying order if, in its judgement, fulfillment of the order would involve violation of the copyright law.

Author:

U.S. Interstate commerce
commission

Title:

Before the Interstate
commerce commission...

Place:

Washington, D.C.

Date:

1927

94-82107-3
MASTER NEGATIVE #

COLUMBIA UNIVERSITY LIBRARIES
PRESERVATION DIVISION

BIBLIOGRAPHIC MICROFORM TARGET

ORIGINAL MATERIAL AS FILMED - EXISTING BIBLIOGRAPHIC RECORD

BUSINESS
530.7
Un343

U. S. Interstate commerce commission.
Before the Interstate commerce commission.
Valuation docket nos. 221, 116 and 123. Boston
& Maine railroad co., Montpelier & Wells river
railroad co., and St. Johnsbury & Lake Champlain
railroad company. In re: Presentation by the
eastern and southern groups of the Presidents'
conference committee on the amount to be included
in the cost of reproduction new estimates for
tracklaying and surfacing. Brief for the Bureau
of valuation. Fred N. Oliver, William J. Walsh,
attorneys, Charles W. Needham, solicitor,
Oliver E. Sweet, assistant solicitor. Decem-
ber 27, 1926. Wash- ington, Govt. print. off., 1927.
cover-title, viii, 229 p. 23¹/₂ cm.

RESTRICTIONS ON USE:

TECHNICAL MICROFORM DATA

FILM SIZE: 35mm

REDUCTION RATIO: 12x

IMAGE PLACEMENT: IA ☒ IB IIB

DATE FILMED: 6/1/94

INITIALS: W.W

TRACKING # : MSH 01207

FILMED BY PRESERVATION RESOURCES, BETHLEHEM, PA.

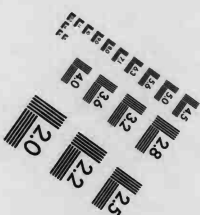
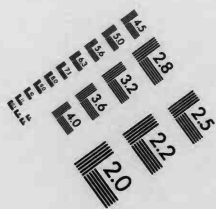
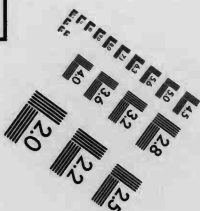
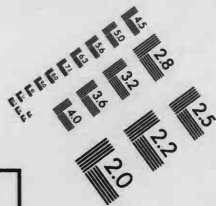
2.0 mm

ABCEFGHIJKLMNOPQRSTUVWXYZ
abcde fghijklmnopqrstu vwxyz1234567890

1.5 mm

ABCEFGHIJKLMNOPQRSTUVWXYZ
abcde fghijklmnopqrstu vwxyz1234567890

PM-MGP 13"x18" METRIC GENERAL PURPOSE TARGET

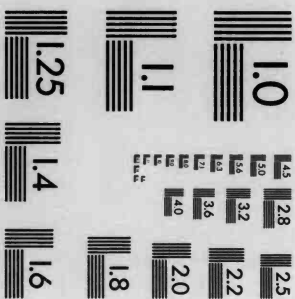


150 mm

100 mm

A5

A4



ABCEFGHIJKLMNOPQRSTUVWXYZ
abcde fghijklmnopqrstu vwxyz1234567890

ABCEFGHIJKLMNOPQRSTUVWXYZ
abcde fghijklmnopqrstu vwxyz1234567890

ABCEFGHIJKLMNOPQRSTUVWXYZ
abcde fghijklmnopqrstu vwxyz
1234567890

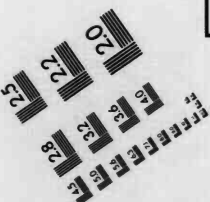
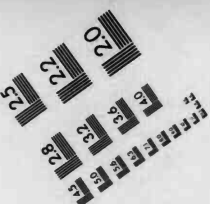
ABCEFGHIJKLMNOPQRSTUVWXYZ
abcde fghijklmnopqrstu vwxyz
1234567890

1.0 mm

1.5 mm

2.0 mm

2.5 mm



PRECISIONSM RESOLUTION TARGETS



1303 Geneva Avenue
St. Paul, MN 55119

ABCEFGHIJKLMNOPQRSTUVWXYZ
abcde fghijklmnopqrstu vwxyz
1234567890

4.5 mm

3.5 mm

ABCEFGHIJKLMNOPQRSTUVWXYZ
abcde fghijklmnopqrstu vwxyz1234567890

BEFORE THE
Interstate Commerce Commission

VALUATION DOCKET NOS. 221, 116 AND 123

BOSTON & MAINE RAILROAD CO., MONT-
PELIER & WELLS RIVER RAILROAD CO.,
AND ST. JOHNSBURY & LAKE CHAM-
PLAIN RAILROAD COMPANY

IN RE: PRESENTATION BY THE EASTERN AND SOUTHERN
GROUPS OF THE PRESIDENTS' CONFERENCE COMMITTEE
ON THE AMOUNT TO BE INCLUDED IN THE COST OF RE-
PRODUCTION NEW ESTIMATES FOR TRACKLAYING AND
SURFACING

BRIEF FOR THE BUREAU OF VALUATION

FRED N. OLIVER,
WILLIAM J. WALSH,
Attorneys.

CHARLES W. NEEDHAM,
Solicitor.

OLIVER E. SWEET,
Assistant Solicitor.

DECEMBER 27, 1926.

D530.7 Un343

Columbia University
in the City of New York

LIBRARY



School of Business

HEC Apr. 5, 1938

COLUMBIA
UNIVERSITY
LIBRARY
INDEX

HISTORY OF PROCEEDING	Page 2
Points of difference in the past.....	2
Origin and development of Formula F.....	3
Disagreement of committee members as to its use.....	4
Its rejection by the Commission.....	6
P. C. C. intervenes in Boston & Maine.....	8
New pricing schedule presented.....	9
New schedule not approved by committee.....	9
Use of Formula F no longer advocated.....	11
ISSUES	12
Chief issue one of principle.....	12
Dissimilar theories of Bureau and Interven- ers.....	12
Bureau reproduces track in new condition....	13
Appreciation is not included.....	14
Bureau does not reproduce inferior track....	15
No attempt is made to reproduce track capa- ble of any particular speed.....	16
Interveners would reproduce seasoned track..	16
The importance of the question.....	17
Other questions raised.....	18
Interveners offered no testimony on Bu- reau's theory.....	19
Bureau's contentions.....	21

I

THE COMMISSION SHOULD ESTIMATE THE COST OF REPRODUCING A NEW TRACK IN ACCORDANCE WITH THE USUAL AND PRACTICAL METHOD OF RAILROAD CON- STRUCTION	22
--	-----------

26197-27-1

(1)

Bus.
D530.7
un343

II

(1) THE COMMISSION SHOULD ESTIMATE COST OF REPRODUCING A NEW TRACK INSTEAD OF A SOLIDIFIED ONE.....	24
Meaning of "Cost of Reproduction New".....	25
No change in the Bureau's practice.....	27
Commission reproduces a new track.....	29
Interveners' contention would require similar treatment of other items of property.....	34
Replacement cost not synonymous with reproduction new.....	34
Conclusions from a correct construction of the term.....	37
(2) REPRODUCTION NEW ESTIMATES CONTEMPLATE A PRACTICAL AND ECONOMICAL MANNER OF CONSTRUCTION.....	38
Bureau guided by actual practice in railroad construction.....	38
Interveners contend that expenditure of time and labor will produce seasoned track.....	38
Impracticable and even impossible to reproduce tracks in seasoned condition.....	39
Factors that contribute to the seasoning and solidification of track.....	41
Commission should not be asked to attempt the impossible.....	42
Amount of traffic on valuation date does not govern the practical and economical construction program.....	43
Bureau makes no assumptions with respect to traffic.....	43
Reasons why it is impracticable to ascertain reproduction estimates by consideration of traffic handled.....	45
(3) THE SEASONING OF THE TRACK IS APPRECIATION AND SHOULD NOT BE INCLUDED IN ACCOUNT 12.....	46
Appreciation an element of value.....	47
The term "appreciation" includes seasoning of roadbed and track.....	48

III

(3) THE SEASONING OF THE TRACK, ETC.—Continued.	Page
Failure of the P. C. C. to state clearly its principles has been confusing.....	49
Element of appreciation is sought in many ways and involves duplication.....	51
Effect of accounting on cost of reproduction new estimates.....	54
Solidification brought about by natural processes and maintenance work charged to operation.....	54
All items of property are inventoried irrespective of the source of the money that created them.....	54
The fact that the expense of seasoning has been charged to operation rather than to capital account does not affect reproduction estimates.....	55

II

THE PRICING SCHEDULE PRESENTED BY THE INTERVENERS IS ONLY A METHOD OF ESTIMATING THE COST OF SEASONING; IT IS ERRONEOUSLY CONCEIVED AND IMPROPERLY BUILT UP; THE COSTS UPON WHICH IT IS BASED ARE INACCURATE; THE MAJORITY OF THE PROJECTS ARE NOT COMPARABLE TO A THEORETICAL REPRODUCTION; AND THE DATA ARE INSUFFICIENT TO SUPPORT THE CONCLUSIONS DRAWN.....	59
Interveners make no corrections in erroneous cost data.....	60
New pricing schedule does not have the sanction of Interveners' engineers.....	61
Schedule is intended as an additive to Bureau prices.....	62

IV

	Page
(1) THE CONSTRUCTION PROJECTS ARE SO UNREPRESENTATIVE OF THEORETICAL REPRODUCTION THAT THEY SHOULD NOT BE USED TO DEVELOP REPRODUCTION PRICES.....	63
Most of projects are line revision, additional tracks, yard tracks or short projects.....	64
Reasons why these are not useful.....	64
Many projects of new work are dissimilar to reproduction and not useful.....	74
The cost data supporting the pricing schedule for the higher speed tracks.....	75
Schedule applicable to majority of mileage in East built up by six line revisions and four second track jobs.....	76
Brief description of these 10 projects.....	79
These 10 projects were not opened for high speed initially.....	83
Period of seasoning after operation required before schedule speed permitted.....	89
Maintenance cost incurred after operation included.....	89
Pricing schedule based on such data is worthless.....	91
(2) THE PRICING SCHEDULE IS ERRONEOUSLY CONCEIVED AND DEVISED.....	91
Many projects omitted in developing pricing schedule.....	92
Reasons which justify the omission of certain projects require the exclusion of others.....	94
Bureau prices include maintenance during construction.....	97
Method of making deductions is faulty.....	101
Deduction of theoretical Bureau prices from actual costs tends to inflate the remaining items.....	104
Fallacy of deducting theoretical unit prices demonstrated.....	105
Erroneous methods applied in plotting the pricing curve.....	106

	Page
(3) OTHER REASONS JUSTIFY THE REJECTION OF THE METHOD ADVOCATED BY INTERVENERS.....	109
Interveners' new attitude as to labor rates reacts to their advantage.....	110
Speed factor does not give reliable results.....	111
Improper comparison with the engineering report prices.....	113
Rigid formula is not proper.....	114
Interveners use cost data in eastern territory only.....	115
The cost data produce excessively high results.....	116

III

THE BUREAU'S PRICES ARE SUFFICIENT TO REPRODUCE A NEW TRACK OF THE TYPE IN EXISTENCE ON VALUATION DATE.....	117
Bureau's method of pricing.....	118
Carriers' cost data indicate that prices applied are liberal.....	120
Contract prices more reliable for estimating the cost of reproduction of account 12.....	123
Carriers' costs found unsatisfactory.....	124
Criticism of a Bureau witness.....	128
THE CONTRACT DATA SUPPORT THE BUREAU'S PRICES.....	130
Contract prices cover over 10,000 miles of new construction.....	130
Contract prices admittedly do not represent the total cost.....	134
Averages of prices made for comparative purposes.....	135
Contract prices include work not proper to account 12.....	138
Average contract cost is somewhere between \$500 and \$600 per mile.....	141
Maximum to be added is \$300.....	142
Memorandum 733 prices are adequate.....	143

VI

INTERVENERS CRITICIZE COMPARATIVELY FEW OF THE CONTRACT PRICES	Page 143
Interveners seek to divert attention from the convincing proof of the contract study.....	144
Only a few "all expense" jobs criticized.....	145
The attempt to discredit Memorandum 733 prices by use of only two contract prices.....	146
Erroneous results are shown.....	147
A consideration of all contracts proves Bureau prices adequate.....	152
INTERVENERS' CLAIM FOR MAXIMUM MEMORANDUM 733 PRICES FOR PLACING BALLAST IS WHOLLY UNSUPPORTED	154
Interveners made no application of their data for placing ballast.....	154
Bureau's data indicate prices ample.....	155
The cost of placing ballast decreases as quantity increases.....	162
IV	
AN ANALYSIS OF THE PROJECTS AND THE COSTS SHOWS THAT THE DATA SUBMITTED BY THE INTERVENERS DO NOT FURNISH A RELIABLE AND TRUST-WORTHY GUIDE TO REPRODUCTION COSTS	165
The costs now presented differ from former reports.....	168
Exhaustive analysis of the costs impossible.....	169
Scope of account 12.....	170
Costs properly chargeable to account 12.....	170
No uniformity in accounting systems prior to 1914.....	171
Charges after beginning of commercial operation not proper.....	173
Requisites of good cost data.....	175
Nature of records underlying carrier's exhibits.....	177
General nature of adjustments made in carrier's data.....	180
Other general defects in the reported costs.....	188

VII

DISCUSSION OF THE PROJECTS USED IN DEVELOPING THE PRICING SCHEDULE	Page 190
New York Central Lines (East), Ex. 222 to 251, incl.....	190
Pittsburgh and Lake Erie Railroad, Ex. 252.....	219
Western Maryland Railway, Ex. 261, 286 to 288, incl.....	219
Hocking Valley Railway, Ex. 263 and 264.....	228
Chicago, Indianapolis and Louisville Railway, Ex. 265.....	231
Bessemer and Lake Erie Railroad, Ex. 270 to 272, incl.....	233
Elgin, Joliet & Eastern Railway, Ex. 273.....	238
Bangor and Aroostook Railroad, Ex. 274 to 279a, incl.....	241
Central Railway of New Jersey, Ex. 282.....	252
Baltimore and Ohio Railroad, Ex. 284.....	253
Pennsylvania Railroad, Ex. 289 to 301, incl.....	256
Erie Railroad, Ex. 304.....	294
Philadelphia and Reading Railroad, Ex. 305.....	295
Buffalo, Rochester and Pittsburgh Railway, Ex. 308 to 310, incl.....	298
Chesapeake and Ohio Railway, Ex. 320 and 321.....	301
C. C. C. & St. L. Railway, Ex. 354.....	305
New York Central Lines (West), Ex. 356 to 361, incl.....	306
Delaware, Lackawanna & Western Railroad, Ex. 377 and 378.....	318
CONCLUSION	324
APPENDIXES	326
Appendix 1. List of line changes, additional track work, jobs less than 10 miles, and yard-track projects.....	326
Appendix 2. Exhibit 400 plotted at 5-mile speed intervals.....	328
Appendix 3. Exhibit 401 plotted at 5-mile Speed intervals.....	329

VIII

TABLE OF CASES

	Page
<i>Bluefield Co. v. Pub. Ser. Com.</i> , 262 U. S. 679.....	36
<i>Des Moines Gas Co. v. Des Moines</i> , 238 U. S. 153.....	36
<i>Galveston Electric Co. v. Galveston</i> , 258 U. S. 388.....	36
<i>Georgia Ry. & Power Co. v. R. R. Com.</i> , 262 U. S. 625.....	36
<i>Knoxville v. Knoxville Water Co.</i> , 212 U. S. 1.....	35
<i>Mineral Park Land Co. v. Howard</i> , 156 Pac. 458.....	42
<i>Minnesota Rate Cases</i> , 230 U. S. 352.....	35, 46
<i>New York, Philadelphia & Norfolk R. R.</i> , 97 I. C. C. 293.....	7, 29, 48
<i>Southwestern Bell Tel. Co. v. P. S. C.</i> , 262 U. S. 276.....	36, 37
<i>Texas Midland Railroad</i> , 75 I. C. C. 1.....	26, 38, 47, 48, 58
<i>Winston-Salem Southbound Ry. Co.</i> , 75 I. C. C. 187.....	30

BEFORE THE

Interstate Commerce Commission

VALUATION DOCKET NOS. 221, 116, AND 123

BOSTON & MAINE RAILROAD CO., MONT-
PELIER & WELLS RIVER RAILROAD CO.,
AND ST. JOHNSBURY & LAKE CHAM-
PLAIN RAILROAD COMPANY

IN RE: PRESENTATION BY THE EASTERN AND SOUTHERN
GROUPS OF THE PRESIDENTS' CONFERENCE COMMITTEE
ON THE AMOUNT TO BE INCLUDED IN THE COST OF
REPRODUCTION NEW ESTIMATES FOR TRACKLAYING
AND SURFACING

BRIEF FOR THE BUREAU OF VALUATION

INTRODUCTORY

The Eastern and Southern Groups of the Presi-
dents' Conference Committee, referred to herein-
after as the P. C. C. or the Interveners, selected the
valuation hearing of the Boston & Maine R. R.
System as a medium to present their cost data and
contentions respecting the cost of reproduction es-
timates for Account 12, Tracklaying and Surfacing,

(1)

and intervened for that purpose. The Interveners are a voluntary association of railroad executives for valuation purposes. Included in the record also is the testimony on the issues raised by the Boston & Maine R. R. System, hereinafter referred to as the Boston & Maine, respecting its tentative valuations, about which it was understood that a separate brief would be filed. This brief, therefore, relates only to tracklaying and surfacing and the testimony with reference to the Boston & Maine issues will be discussed in a separate brief later to be filed.

HISTORY OF THE PROCEEDING

In the past there have been three principal points of difference between the Bureau and the carriers in determining the cost of reproduction new for Account 12. (1) The divergent positions, only vaguely understood, as to the condition of the track being reproduced. This dispute accounts for the greater part of the difference in the costs claimed. (2) The character or type of construction projects to be used to develop reproduction costs. The Bureau has always taken the position that construction projects used to develop unit prices for Account 12 should be new work of sufficient size to be representative of reproduction and has, therefore, not used line revisions, additional track work, or short projects. The inconsequential railroad construction in eastern territory during the pricing period led to disagreements between

the Bureau and eastern carriers who have been using such data to develop their claims. The disagreement on this point between the Bureau and western carriers has not been so pronounced because there was considerable new construction in western territory. (3) The usefulness of costs shown on the carriers' books as the basis for reproduction new estimates for Account 12. The Bureau, since the beginning of valuation work has vainly sought to develop actual costs to carriers for Account 12, although Bureau accountants have endeavored to obtain reliable information from the carriers' records. The accountants found it impossible to make an accurate separation of the recorded costs so as to make a proper redistribution between account 12 work and other work.

For the past few years the Eastern Group of the Presidents' Conference Committee has advocated the use of a formula, commonly known as Formula F, to determine the cost of reproduction new estimates for Account 12, Tracklaying and Surfacing. The outstanding feature of this formula is that it includes, for each mile of track, for lining and surfacing during construction, an amount derived by multiplying by \$10 the maximum permissible speed of trains in miles per hour. The speed factor, which is a substantial part of the formula, was purely an arbitrary method selected without support of data.

Formula F, its origin, use, and defects have been repeatedly discussed in briefs of the Bureau, with

which the Commission is familiar, and it will be unnecessary here to enter into an extended discussion concerning the formula. It might be well to point out that the formula was not based on cost data, but was built up by a synthetic process and the use of a hypothetical organization. It appears that 11 different formulæ were tried before Formula F was decided upon by the Interveners. (Ex. 29.) The idea apparently had its origin in a somewhat similar formula used by the Railroad Commission of California in estimating costs of tracklaying and surfacing, which was not based on data but was largely a matter of estimate and opinion. (Tr. p. 631; Ex. 29.) There have been various attempts on the part of the Interveners to check Formula F by the use of cost data. The first collection of data used in checking the formula was costs for about 1,000 miles of track, mostly in western territory. The formula was composed of variables which were adjusted so that the total result would be equal to the costs which have been shown in many cases to be erroneous.

Formula F was originally developed by a subcommittee on tracklaying and surfacing of the Presidents' Conference Committee, composed of Mr. Hansel, chairman, Mr. C. S. Churchill, Vice President of the Norfolk & Western, and Mr. A. W. Newton, Chief Engineer of the Burlington. (V. D. 159, Tr. p. 98.) Formula F was apparently the product of one engineer, and represented an attempt by Mr. Hansel to estimate the cost of track-

laying and surfacing. (Tr. p. 2271.) The other members of the original committee were not in agreement as to its use. (Tr. p. 2271.) Both Mr. Churchill and Mr. Newton did not think that the speed factor in Formula F would work out. (Tr. p. 2273.)

Several fundamental objections to the use of Formula F have been demonstrated by the Bureau in previous proceedings. One of the most serious criticisms has been directed at the use of erroneous cost data as a check on the formula. Another source of objection was the speed factor in estimating the costs. As stated, there is included an amount arrived at by multiplying the maximum permissible speed in miles per hour by \$10. For instance, where the permissible speed is 60 miles per hour, there is added \$600 for each mile of track in the estimate. A third source of objection was the practice of estimating separately the elements of tracklaying and surfacing to arrive at the total costs. It has been the Bureau's experience that it is impracticable to develop cost figures for tracklaying and surfacing based upon the combination of estimated costs of the separate elements. (Tr. p. 6437.) It has found a wider variation in the reported costs of these elements separately than in the total reported costs.

At one of the early hearings in 1923, the Boston & Maine, through witness Cummings, introduced Formula F and certain diagrams showing the manner of its application in support of the unit prices

claimed for tracklaying and surfacing. It also offered Mr. Hale's testimony in the Mobile and Ohio case in support of Formula F prices (Ex. 29; Tr. p. 350), and his testimony in the New York, Ontario and Western (Ex. 30, 31; Tr. p. 350). Counsel for the Bureau offered a list of the projects supporting Formula F as furnished to the Bureau by the Interveners. (Ex. 34.)

An adjournment was taken to enable the Boston & Maine to bring in witnesses from various other carriers to prove the supporting data for Formula F. Subsequently, however, in valuation Docket 159, the New York, Philadelphia & Norfolk Railroad Company introduced testimony showing the development and use of Formula F and the Boston & Maine intervened and actively participated with the apparent thought that it would not then be necessary to offer the supporting data in its case. In that proceeding, the carrier called as witnesses engineers from certain other carriers to prove the supporting data for Formula F. While the P. C. C. did not formally intervene in that proceeding, Mr. Hansel and Mr. Hale were present and testified. The carriers there had a full opportunity to be heard and it is assumed that they presented the proof which they regarded as necessary to support the formula. The Bureau in that proceeding introduced testimony in rebuttal and took the same position as it has done in other cases; that is, that Formula F is not a proper method to determine the unit prices for tracklaying and surfacing. In its

decision in *New York, Philadelphia & Norfolk Railroad*, 97 I. C. C. 273, at page 293, on April 7, 1925, the Commission rejected the use of Formula F in the following language:

A substantial amount of the total prices for tracklaying and surfacing set out in Formula F comes from the manner in which the element of speed is considered. The theory is that the greater the speed the greater will be the lining and maintenance during construction, and it is estimated that the cost of this more extensive work is equivalent to the speed multiplied by 10. *Nowhere does there appear in the record any foundation for this estimate.* We are presented with no facts or data by which we may test its accuracy and our own investigations have led to no such conclusion. Speed is, of course, an element to be considered, as obviously more labor is expended in preparing a track for high-speed operation than one which is used only as a siding or for storage purposes, but we are by no means convinced that the extra labor costs are to be measured in the manner proposed by the carriers.

The record is not persuasive that the prices for tracklaying and surfacing contained in Formula F may be depended upon to afford a reliable guide in determining such prices for reproduction purposes. (*Italics ours.*)

It will be observed that the Commission unqualifiedly condemned the use of the speed factor which is an inseparable part of Formula F. There is no

foundation for this estimate, because, as we have said, the speed factor was an arbitrary method without support of data. While the language in the N. Y. P. & N. decision appears definite enough to us, the Interveners apparently construed it as an invitation to present again their testimony. In October, 1925, at the adjourned hearing in the Boston & Maine proceeding, the Presidents' Conference Committee were granted permission to intervene for the purpose of once more presenting their testimony regarding tracklaying and surfacing prices.

It was assumed by the Bureau that the purpose of the intervention was to enable the Interveners to present further data in support of Formula F, and that the proceeding would be in the nature of a rehearing of that feature of the N. Y. P. & N. case. Counsel for the Interveners, however, stated that there was no intention to support any formula but that the purpose was to attempt to ascertain the correct unit prices to apply for tracklaying and surfacing.

Beginning in January, 1926, the Interveners brought witnesses here from the southern and eastern carriers to show the costs of tracklaying and surfacing on all projects constructed subsequent to 1900 for which cost data could be secured. Throughout the hearing these cost data were presented on 149 projects with no indication or statement as to their application. Many of the witnesses

from the individual carriers, brought here to testify as to correctness of the cost data, thought that they were supporting Formula F. As we shall later show, the costs developed on these projects varied widely from costs heretofore reported on the same projects by the individual carriers or by the P. C. C., either to the Bureau or in hearings. (Tr. p. 67.) No attempt was made to explain or support the speed factor of Formula F. At the conclusion of the presentation, a new pricing schedule was offered.

The presentation of these data was ostensibly sponsored by a combined subcommittee on tracklaying and surfacing of the Eastern and Southern Groups. This committee, separate and distinct from the original committee which evolved Formula F, was recently organized for the purpose of this proceeding. The original committee has been disbanded for some time. (Tr. p. 6223.) Members of the new subcommittee were present throughout the hearing, but at no time were they placed upon the stand by the Interveners to testify respecting the reason for the production of all these data or the conclusions to be drawn therefrom. After the Interveners had concluded the presentation of their case and after the Bureau had vainly attempted to find out what use was to be made of these data, the Bureau called as its own witnesses members of the subcommittee of the Eastern and Southern Groups who were present at the hearing, and endeavored to elicit from

them an expression as to the use to be made of this complicated mass of detail. There was a surprising lack of information on the part of the members of the subcommittee. They apparently knew little about the real presentation and had formulated no opinions respecting the results, although their testimony was given after the summary sheets and the new pricing schedule had been introduced. They would not commit themselves other than to say that they presented the data to the Commission for its use. It definitely appears that the new pricing schedule had not received their approval. Mr. Cummings, Valuation Engineer for the Boston & Maine, a member of the committee, testified that the subcommittee held no meeting during the hearing, and that there has been no discussion as to whether the present subcommittee approves Formula F. Mr. Roach, of the New York Central Lines, is chairman of the subcommittee. He was appointed as Chairman about nine months before when the committee was enlarged by Mr. Kittridge, Chief Engineer of the New York Central, acting as chairman of the Engineering Committee of the P. C. C. Formula F was discarded for use by the New York Central because it does not produce figures high enough for high-speed tracks. (Tr. p. 2323.) The new pricing schedule produces higher sums for high-speed tracks. Mr. Silliman, Engineer for the Southern Group, also a member of the subcom-

mittee, had been present at only two meetings, the last one in October, 1925.

The pricing schedule now offered was developed by a statistician of the Eastern Group under definite instructions from counsel. He used the projects designated by counsel, followed the method outlined by counsel, and no one else gave him directions. Thus it would appear that Formula F was developed by one engineer, with whom the remainder of the original committee disagreed, and that the present pricing schedule was developed by counsel for the Interveners without the expressed approval of any member of the committee. The same fundamental idea prevails in the present pricing schedule as was condemned in Formula F, and that is, that the element of speed should be recognized as the controlling factor by the Commission in estimating the unit prices to apply to tracklaying and surfacing.

The one definite fact established is that the Interveners no longer advocate the use of Formula F, and did not introduce the data in this proceeding in support of that formula. While in each of the cost studies and summaries comparisons were made with the results of the application of Formula F, the Interveners, in brief, finally took the position that they no longer urge the use of the formula. However, they have not definitely disowned it. (Br. p. 76.) The situation is unsatisfactory, as even now we are uncertain as to the position which will be taken respecting these two formulæ by the

individual carriers. Many carriers have already relied upon Formula F to support prices for track-laying and surfacing. Moreover the recommendations of the Interveners do not bind individual carriers in the presentation of future claims. As previously stated, the members of the subcommittee, engineers for various carriers, would not commit themselves either with respect to Formula F or the new pricing schedule. The Formula produces higher unit prices for slower speed tracks and lower for the higher speeds than does the present schedule, which may affect the attitude of the particular carrier with respect to the adoption of the new schedule.

ISSUES

The issue is one of principle

At the outset, it should be observed that the chief difference between the Interveners and the Bureau with reference to the proper prices to apply in the cost of reproduction new estimates for Account 12, Tracklaying and Surfacing, is one of principle. The Bureau, following the method adopted by the Commission, has been and is estimating the cost of reproduction new of a track in a different condition from that assumed by the Interveners. This is the first proceeding where the Interveners have clearly stated that this difference in principle exists. It was not made plain in the *New York, Philadelphia & Norfolk Case*. It was supposed

that the estimates in that case covered tracks in a condition similar to that assumed by the Bureau. Counsel has been of real service in making a clean-cut issue of principle, and a reaffirmation by the Commission of its position on this question should eliminate much of the endless time spent on this difficult and complicated problem. It would appear, however, that having some doubt as to the soundness of the principle contended for, the Interveners are saving a point for the future and contend that the Bureau's prices are inadequate even for the condition of tracks that it is reproducing, although this latter contention is wholly unsupported by testimony.

Condition of the track assumed by the Bureau for reproduction estimates

It should be made plain in the beginning that there is no difference between the Interveners and the Bureau as to the *type* of track reproduced. *The difference is only in the condition of the completed track.* The Bureau estimates the cost of reproduction new of a track which, after it attains the same age and undergoes the same service conditions, will be equivalent to the carriers' tracks on valuation date. Its unit prices are sufficient to cover the cost of reproduction new of such tracks. It includes in its estimates for cost of reproduction new in Account 12 every item of property whether installed before the road is placed in operation or thereafter. The Bureau assumes a rational and

practical method of construction and that under the usual practice a gradual solidification would be brought about through operation. Railroads are generally built in the manner in which the Bureau contemplates a theoretical reproduction. (Tr. p. 6371.)

The Bureau has inventoried the ties, rails, ballast, etc., and is applying a price to cover the assembling of them in the same type of track that existed on valuation date. There is also included a sufficient amount to cover such maintenance during construction as is considered to be necessary prior to operation. It is, however, a new track and there is no attempt to reproduce the appreciation which comes only through a period of use. It does not go further and in its reproduction program attempt to substitute artificial processes for the pounding of the trains and the action of the elements which have brought about this perfected or solidified condition.

Value of appreciation is not included

Nothing has been included in the Bureau's estimates for reproduction new of Account 12 for the intensive surfacing necessitated by and compacting due to traffic, or other factors which may be elements of value but are not construction costs. Some tracks are in better operating condition than others. But many elements produce this condition to which costs are not assignable. Compacting from trains is an important element. The cost

of reproduction estimates do not reflect any of such expenditures. (Tr. p. 6371.) How this element of appreciation should be treated or considered by the Commission is not an issue in this case, the only question being the proper price to apply for the cost of reproduction new.

The Bureau does not reproduce a "slow" track; any limitation as to speed is due to newness

As previously stated, the Bureau is estimating the cost of reproduction of the same type of tracks that are found on valuation date. The tracks, however, are in a new and unseasoned condition and no effort is made to estimate under "cost of reproduction new" the cost of a seasoned and solidified track. Counsel throughout his brief reiterates a statement made by a Bureau witness that such tracks would permit operation of trains from 15 to 20 and 25 miles per hour, and draws the conclusion that the Bureau is reproducing "track of so low a grade as one which was capable only of such very slow speed." (Br. p. 7.) Counsel has drawn an unwarranted inference from the testimony. The Bureau does not reproduce a "low grade" or "slow" or "inferior" track. The same type of track is reproduced and any limitation of speed is due solely to its newness. In other words, the Bureau attempts to reproduce the track in the condition in which it would usually be opened for operation and includes in the estimated cost of re-

production new the cost of maintenance during construction and such surfacing as is ordinarily done prior to operation.

No attempt is made to reproduce a track capable of any particular speed. The engineers of the Bureau reproduce new the track with all the materials found therein on valuation date, giving consideration to the type of construction. While the maximum speed at which it may be possible to run trains is probably dependent both on the kind of track reproduced and its condition, it appears that the latter factor is more important. The fact that on a new track trains can not be operated at great speeds would seem to be due more to the condition of the track than the type of construction.

Intervenors contend that a seasoned track should be reproduced

The Intervenors contend that the cost of reproduction new estimates should be sufficient to cover the cost of reproduction of the tracks in their solidified and seasoned condition, capable of sustaining high speed and of carrying the traffic which the carriers had on valuation date. What they are really asking for is that the *value* of the seasoned track should be stated under the heading "cost of reproduction new." The Bureau's prices are admittedly not sufficient to reproduce the present tracks for initial operation in their present state of perfection. Such a reproduction would not

be practicable or physically possible, nor can the costs of a seasoned track be estimated with any reasonable degree of accuracy.

The importance of the question

We think it not improper to suggest to the Commission the importance of the question, with particular reference to the amount of money that is involved in this difference of principle. This is the most extravagant claim so far made with respect to Account 12. If the Commission were to accept as correct the principle now advanced by the Intervenors and accept the type of data now offered as the measure of the cost of reproduction on such principle, there would be an increase in the cost of reproduction estimates for all railroads in the United States of nearly one-half a billion dollars (Tr. p. 6478) and not "some billions" as stated by counsel in brief. (Br. p. 13.) As the difference is more pronounced for the higher speed tracks, the greater increases would go to the large systems, such as the New York Central and the Pennsylvania. Counsel for the Intervenors emphasizes the amount of money involved apparently with the idea of creating the impression that this tremendous increase is the controlling reason advanced by the Bureau for reproducing the tracks in their new and unseasoned condition. (Br. p. 13.) The amount of

money was referred to at the hearing solely for the purpose of pointing out the importance of the principle under consideration.

In this connection, Interveners in brief state "that beyond carrying out faithfully and honestly the commands of Congress, the Commission is not interested in the result whether it is high or whether it is low." (Br. p. 13.) Counsel overlooks the fact that the Commission is interested in arriving at a result which is just both to the utility and the public. In doing so, it would seem to us that consideration should be given to the propriety of reading into these valuations excess costs which in the future as in the past would, under the ordinary and normal method of building and operating railroads, be paid for by the public out of rates.

Other questions raised

This question of principle is by far the most important question to be decided; indeed, we think it is the only question to be decided. The Interveners introduced their cost data and summarized the results thereof to show the cost of reproduction of the tracks in the seasoned condition existing on valuation date. No testimony was introduced by them to show the cost of new tracks on the Bureau's theory. On the other hand, the Bureau offered no testimony to show the cost of reproduction new of

tracks in their solidified and seasoned condition but directed its proof to the support of the unit prices applied to the same type of tracks in their new and unseasoned condition. We assume that if the question of principle is determined in accordance with the contention of the Interveners, the Commission will undoubtedly desire, before reaching a final decision, to have an investigation along this line made by its own experts. The utter lack of trustworthy data would seem to indicate that there is no reliable basis for an estimate of the cost of reproduction of appreciated tracks and that necessarily an arbitrary estimate would have to be used.

As stated, the testimony and summaries introduced by the Interveners were not offered to show that the Bureau's prices are inadequate for the tracks in the condition assumed by the Bureau. In order to advise the Commission, the Bureau, however, introduced testimony in support of its general scheme of pricing. Counsel for the Interveners now argues that the Bureau's own data show that its unit prices are insufficient. The burden is upon the Interveners first to show by competent evidence that the Bureau's prices are inadequate, and this they failed to do. The presumption of correctness which attaches to the findings of an administrative body is not overcome and it would seem, therefore, that the evidence raises no issue on that point.

While the Bureau's proof shows conclusively that its unit prices are adequate for the condition of the track it is reproducing, it should be pointed out that in our opinion the Commission in this proceeding, which is in its nature *ex parte*, can not make a general finding as to the adequacy of the Bureau's prices. The Bureau has not used a formula to estimate the prices for tracklaying and surfacing. While Memorandum 733 furnishes a guide, the prices to be applied to a particular carrier are primarily determined by the judgment of the engineers, who may go either above or below the memorandum prices. In practice it will be found that the prices applied by the Bureau for Account 12 in most cases are in the upper range of that schedule or above the maximum and in some cases exceed the maximum as much as several hundred dollars. In this proceeding the prices applied by the Bureau to any carrier except the Boston & Maine are not a matter of record. There is no real issue in this case between two separate and distinct formulae. The issue rests between a mechanical formula on the one hand and a judgment figure on the other hand which varies according as conditions warrant. Of course in dealing with the issue in the Boston & Maine case proper, the Commission may decide either that the judgment prices used for that carrier are adequate or inadequate, but there is no

basis for making a general finding with respect to the prices which have been applied by the Bureau to all carriers.

The Presidents' Conference Committee, as an organization, has no direct interest in the proceeding which would entitle it as a matter of right to intervene. It is not subject to the orders of the Commission. Tentative valuations are not required by law to be served upon it. It has been able, however, to collect in a record cost data which would have been impracticable for an individual carrier to gather, and in that manner has served a useful purpose both to the carriers and the Commission.

Neither at the hearing nor in brief did the Interveners raise any question as to the cost of reproduction less depreciation estimates. No testimony was introduced with reference to that subject, and it is, therefore, not in issue.

CONTENTIONS

The major contentions of the Bureau are briefly stated below. For convenience we will discuss them separately in the order designated.

I

The Commission should adhere to its present practice of reporting as the cost of reproduction new for Account 12, Tracklaying and Surfacing, the estimated cost of reproducing a new track in accordance with the usual, normal, and practical method of railroad construction. The element of seasoning or appreciation should not be reported in Account 12, but treated as heretofore by the Commission

II

The pricing schedule presented by the Interveners is only a method of estimating the cost of seasoning; it is erroneously conceived and improperly built up; the costs upon which it is based are inaccurate; the majority of the projects are not comparable to a theoretical reproduction; and the data are insufficient for the conclusions drawn

III

The Bureau's prices are sufficient to produce a new track of the type in existence on valuation date

IV

An analysis of the projects and the costs shows that the data submitted by the Interveners do not furnish a reliable and trustworthy guide to reproduction costs

I

THE COMMISSION UNDER "COST OF REPRODUCTION NEW" SHOULD ESTIMATE THE COST OF REPRODUCING A NEW TRACK IN ACCORDANCE WITH THE USUAL, NORMAL, AND PRACTICAL METHOD OF RAILROAD CONSTRUCTION. THE ELEMENT OF SEASONING OR APPRECIATION SHOULD NOT BE REPORTED IN ACCOUNT 12, BUT SHOULD BE TREATED AS HERETOFORE

Before taking up a discussion of the question of principle, we think it advisable to call attention to

the tactics adopted by counsel for Interveners in brief. An attempt is made to focus attention upon unimportant points in the hope of obscuring or beclouding the real issues and perhaps to divert attention from the obvious weakness of the Interveners' case. Counsel seizes upon a phrase used by Bureau's witness, "15 to 20 or 25 miles an hour" and draws numerous erroneous conclusions therefrom throughout the brief. He conjures up one or two imaginary Bureau contentions in order to destroy them. For instance, he devotes considerable space to an alleged accounting contention of the Bureau which from our standpoint has little or no bearing on the principle here involved.

A brief description of the ordinary manner of railroad construction may provide a useful background for the discussion that is to follow. After the grading is completed, there are laid rails, ties, ballast, etc. The track material is assembled upon the new substructure. When the road is turned over to commercial operation, it is in perfect line and surface. But as soon as the operating department begins to operate trains over it, on account of the soft condition of the bank and the uncompacted condition of the ballast, the roadbed sinks in spots and other defects appear due to operation and the action of the elements which require additional ballast, resurfacing, and relining to maintain the tracks in safe operating condition. The movement of trains, the action of the elements, and the

continued application of labor in perfecting these defects as they occur finally result after the lapse of time in the perfected or solidified condition of the roadbed and track. This solidification or seasoning is sometimes called appreciation. The expense of physically developing the roadbed is spread over a period of time and is paid for out of operating expenses as maintenance.

Our chief contentions with respect to the proper principle to be applied are briefly that (1) under the Act, the Commission should estimate the cost of reproduction of a new track instead of a seasoned one, (2) the theoretical reproduction should be considered as taking place in the rational and practical manner ordinarily followed in normal railroad construction, and (3) seasoning is a part of appreciation and should not be included in the cost of reproduction new of Account 12. We shall discuss these contentions in the order named.

**(1) UNDER THE ACT THE COMMISSION SHOULD ESTIMATE
THE COST OF REPRODUCTION OF A NEW TRACK
INSTEAD OF A SEASONED ONE**

Meaning of the term "Cost of reproduction new"

One of the definite issues raised by the Interveners is the meaning of the phrase "Cost of reproduction new." The Bureau's position is that "Cost of reproduction new" means exactly what the words themselves imply; that is, the cost of reproduction of a new property. In brief, counsel argues for a new and novel construction of the

words "Cost of reproduction new" and contends that this term means the cost of producing over again or anew the existing property in the precise condition in which it was on valuation date. In other words, the Commission, in pricing Account 12, should state the cost of producing a track which is both *new* and *seasoned* at the same time. In substance, he defines the word "new" as meaning "old."

Under the Act the Commission is required to list the property of the carrier and ascertain and report both the cost of reproduction new and the cost of reproduction less depreciation of all items of property. The property to be listed is the physical property and the cost of reproduction estimates apply to such physical property. These two costs obviously have reference to the carrier's property in two different conditions. The only one which can conceivably refer to conditions on valuation date is the cost of reproduction less depreciation. In its cost of reproduction new estimates, the Commission determines and applies prices for new ties in Account 8, new rail in Account 9, and, similarly, new materials and the costs for applying or assembling the new materials in the other accounts. But the Interveners here would have the Commission make an exception of Account 12 and apply unit prices, not for a new track, but for a solidified and seasoned track such as existed on valuation date.

If the theory advanced by the Interveners is sound, it will be necessary for the Commission to halt its valuation work and start over again. If counsel's contention is correct as to the meaning of cost of reproduction new, there would be no occasion nor necessity for the requirement that cost of reproduction less depreciation be found. If no significance is to be given to the word "new," it must follow that the entire property of the carrier, consisting of rails, ties, equipment, etc., must be replaced in the cost of reproduction new estimates in the condition in which they are found on date of valuation. If Congress had intended that cost of reproduction new should refer to the property in the condition in which it existed on valuation date, the requirement of ascertaining cost of reproduction less depreciation would be wholly superfluous. We must presume that Congress had a purpose in requiring both costs to be ascertained and reported and that they refer to two different things.

When the Act was passed the phrase "Cost of reproduction new" had acquired a clearly defined and well understood meaning. At page 16 of the *Texas Midland Railroad*, 75 I. C. C. 1, the Commission said:

* * * we interpret the term "Cost of Reproduction New" literally, i. e., the cost of reproducing under present conditions the existing property of the carrier without computing depreciation.

and again at Page 35:

* * * the property to be reproduced is the *existing property as it was when it was put into its present service.*

Counsel seeks to confuse the issue by what we believe is a misapplication of the decision in the *Texas Midland Railroad*, *supra*, with regard to relay rail. What the Commission decided was that the cost of reproduction new should relate to the condition of the property at the time of construction. This does not necessarily mean that all of the elements composing that property should be new. There is a well-recognized classification of material known as relay rail, and in the original construction of a new property of any size some material of this class is likely to be used. We believe that the decision with respect to relay rail is in full accord with the position which the Bureau takes in this case.

The Bureau from the beginning has reproduced a new track

The present practice of the Bureau in estimating the cost of reproduction new for Account 12 is in accord with its practice from the beginning and has been approved by the Commission in numerous cases. The Engineering Board and Director Prouty thoroughly considered the question of the condition of track covered by the estimates and announced that the schedule of prices were for a

new road rather than for an old one, seasoned and capable of carrying trains at high speeds. In Memorandum No. 366 of September 22, 1920, addressed to Director Prouty, the Engineering Board said:

The Bureau has heretofore estimated price for new rather than for an old road which is seasoned and capable of carrying trains at high speeds, and it recommends that no change be made in the present general rule. (Ex. 411.)

In a letter to Director Prouty, dated September 27, 1920, Mr. Jones, then a member of the Engineering Board, stated:

My view is that our reproduction estimates do not purport to reproduce track for high-speed service, as this can only be brought about through years of maintenance and solidification of embankments. (Ex. 412.)

In reply, Director Prouty, September 30, 1920, said:

You are, of course, right in saying that we do not undertake to reproduce a track like the Pennsylvania or the New York Central, but we do undertake to reproduce a track of the character which that track would have been at the beginning of operation, and this is a very much better one, requiring much more work for its construction and especially its service than would a track upon an inferior railroad. (Ex. 413.)

Witness Saunders for the Bureau testified that the Bureau recognizes the difference in weight of rail, quantity of ballast, and general type of construction. (Tr. p. 6374.) In other words, the Bureau attempts to apply a price which gives consideration to the type of particular tracks under consideration, and the only difference between the tracks which it reproduces and the tracks on valuation date is the condition of such tracks.

The Commission reproduces a new track

In support of their contention the Interveners rely chiefly upon the Commission's decision in *New York, Philadelphia & Norfolk Railroad, supra*. From this decision they conclude that the Commission stated unequivocally that the cost shown under "cost of reproduction new" is the cost of reproducing a fully seasoned track. Counsel interprets the decision as stating that the Commission thought the prices used by the Bureau were for a fully seasoned track. With this interpretation of the N. Y. P. & N. decision in mind the Interveners' counsel in effect suggests that the Bureau has been misleading the Commission as to the kind of track reproduced and that the Commission has failed to inform itself as to what its own employees have been doing. It becomes material, therefore, to ascertain what the Commission has decided with respect to the cost of reproduction new of Account 12, Track-laying and Surfacing.

The Interveners state that, at the time of the N. Y., P. & N. decision, the Commission was not advised that the Bureau was reproducing a new track instead of a seasoned and solidified one. As pointed out, the Engineering Board and the Director repeatedly announced that the cost of reproduction new estimates applied to a track in its new condition. In its tentative and final valuation reports, the Commission has estimated the cost of reproduction new for Account 12 of a new track. These are the reports of the Commission and not of the Bureau. To suggest that the Commission "appeared to be ignorant" (B. & M. Br. p. 136) with respect to the condition of the track reproduced by the Bureau is tantamount to saying that it has been derelict in its duty and that it has *pro forma* adopted the work of its employees through these many years without inquiry. A careful reading of its decisions should satisfy any impartial mind that the Commission is not only well advised of and approves, but directs the work of the Bureau in estimating the cost of reproduction new for Account 12.

Some light may be thrown upon the Commission's understanding of the phrase "Cost of reproduction new" with reference to tracklaying and surfacing by an examination of some of its previous decisions. In the *Winston-Salem Southbound case*, 75 I. C. C. 187, at page 195, the Commission stated:

We have already pointed out that the valuation amendment contemplates the ascer-

tainment of the cost of reproduction *new and not the cost of reproduction in the present condition*.

This statement is reiterated at page 198, where it is stated that:

The valuation amendment requires us to ascertain the cost of reproduction new and not the cost of reproduction in any other condition.

The position of the Commission as to the interpretation of the words "Cost of reproduction new" could not be more clearly stated. This language is conclusive that the property to be reproduced is such a property as would be again constructed if it were to be actually obliterated—that is, a newly built road. As we understand the language of counsel it is not intended to imply that the Commission is in error in its construction of its duties, but that the Bureau has not followed the Commission. This should set aside once and for all any idea that the Commission supports the contention of the Interveners.

That there was no difference between the Bureau and the Commission in the *N. Y. P. & N. case*, *supra*, as alleged by the Interveners, and that there is none in the present instance is indicated by the following language from page 297 of that decision:

In estimating the amounts to be included on reproduction for tracklaying and surfacing, it is our purpose to apply such unit

prices as will be sufficient to cover all necessary elements of expenses in producing tracks *which, under the same conditions of service and age, would duplicate the existing tracks.*

* * * Our examination of the records satisfies us that the prices contained in Memorandum 335 for tracklaying and surfacing will ordinarily suffice to cover the cost of constructing a *new track as of valuation date*, which will contain the same quantities of rail, track material, and ballast as are contained in the track under reproduction and *put in a suitable condition for safe operation.* (Italics ours.)

On the same page, the Commission refers to a contention of the carrier "that the prices used by the Bureau are not adapted to the production of the *kind of unseasoned track that would have to be produced in any rational program for the reproduction new* of its track as it existed on valuation date." Thus it will be seen that the Interveners are under a misapprehension when they claim that the Commission is uninformed as to the condition of track being reproduced by the Bureau. This is further evidenced by the following quotation from the N. Y. P. & N. case at page 297:

The remaining protest against the amount which we have reported as the cost of reproduction new of tracklaying and surfacing rests upon our alleged failure to include therein the cost incurred by the carrier in

bringing the roadbed *and track into the seasoned and solidified condition in which it existed on valuation date.* (Italics ours.)

The cost of reproducing a new track was estimated by the Bureau there as here, and the Commission refused to add any separate sum for the alleged costs incurred in bringing the track to the condition in which it existed on valuation date. The excerpts quoted above, in our opinion, indicate conclusively that the Commission did not have in mind a seasoned, solidified track capable of high-speed operation, but rather a *new* track suitable for a *safe* operation and which, under the influence of service and age, *would* duplicate the existing tracks. The inference is clear that complete similarity to the existing tracks will occur some time *in the future* when the action of traffic and of the elements will have done their work.

What the Interveners actually contend is that a different theory should be applied to tracklaying and surfacing from that applied to the other accounts when estimating cost of reproduction new. They seek to confuse the issue by asserting that the Bureau has departed from the construction which the Commission has placed on that term. The Bureau has applied the same principle to tracklaying and surfacing as it has applied to the other accounts.

Aside from the fact that the Commission has already stated its position on this question, there

must also be considered the inherent inconsistency of the stand taken by the carriers. The question naturally arises as to why the Interveners place so much emphasis upon the necessity of reporting under the cost of reproduction new of Account 12, the cost of a seasoned track, while they are equally insistent with respect to practically every other account that the words "Cost of reproduction new" shall be literally applied. We hear no clamor to report the cost of reproducing the rail in its condition as of valuation date; no insistence that the Commission report as the cost of reproduction new the cost of reproducing the bridges, the ties, the equipment of the carriers in the condition in which they existed on date of valuation. Why, therefore, should there be an insistent demand that the cost of reproduction new of Account 12 should be sufficient to reproduce a track in the condition in which it existed on valuation date? Both positions taken by the Interveners can not stand together. If their contentions are to be accepted as to Account 12, they must, to be consistent, be applied with respect to every other account under which their various items of property are listed.

Cost of reproduction new is not synonymous with replacement cost

Counsel also lays down the proposition that the cost of reproduction new is the cost of replacing the existing property, and in brief, page 15, cites certain cases in which he contends that the Supreme

Court used synonymously the words "reproduction cost," "cost of reproduction," "cost of reproduction new," and "replacement cost." These cases have been so often cited before the Commission that we feel reluctant to discuss them, but a brief analysis is necessary to show the error of counsel's contention.

In the *Knoxville v. Knoxville Water Co.*, 212 U. S. 1, 9, the court said:

This valuation was determined by the Master by ascertaining what it would cost, at the date of the ordinance, *to reproduce the existing plant as a new plant*. The cost of reproduction is one way of ascertaining the present value of a plant * * * but that test would lead obviously to incorrect results, if the cost of reproduction is not diminished by depreciation * * *. (Italics ours.)

The court was of the opinion that "cost of reproduction" meant the cost to reproduce a new plant and not the cost to replace the plant in its then present condition. The term "replacement cost" is not used.

In the *Minnesota Rate Cases*, 230 U. S. 352, 436, the Master made cost of reproduction new the basis of value and did not make an allowance for depreciation. The Supreme Court said:

And when particular physical items are estimated as worth so much *new*, if in fact they be depreciated, this amount should be found and allowed. (Italics ours.)

In this case the word "new" used in connection with the term "Cost of Reproduction" apparently had a special significance.

In *Des Moines Gas Co. v. Des Moines*, 238 U. S. 153, 162, the Master valued the property on the basis of the cost of reproduction new less depreciation. Referring to this method, the court said:

He first found what he thought was the base value of the property i. e., "what it would cost to produce it at the present time new. * * *" From this he deducted depreciation. (*Italics ours.*)

In *Galveston Electric Co. v. Galveston*, 258 U. S. 388, 391, 392, the court refers to the fact that the Master took as the base value "Cost of Reproduction" * * * less depreciation. The terms, "replacement cost", or "Cost of Reproduction New" are not used.

In *Bluefield Co. v. Pub. Ser. Com.*, 262 U. S. 679, 689, the court held it erroneous to fail to give consideration to "the company's detailed estimated Cost of Reproduction *New* Less Depreciation" on the strength of the *Southwestern Telephone Case*, 262 U. S. 276, where the company's engineer submitted estimates of Reproduction Cost New and Reproduction Cost, Less Depreciation.

In *Georgia Ry. v. R. R. Commission*, 262 U. S. 625, 629, the court said:

The companies assert that the rule to be applied * * * is Reproduction Cost * * * Less Depreciation.

* * *

The companies claim that it should be valued at its Replacement Cost.

* * *

and it gave careful consideration to Replacement Cost. But it likewise held that there was no rule which required that in valuing the physical property there must be a "slavish adherence to Cost of Reproduction, Less Depreciation.

This is the only case cited by counsel wherein the court has used the term "Replacement Cost" and it will be noted that the term is used in connection with "Reproduction Cost, Less Depreciation."

Counsel states that Justice Brandeis in his dissenting opinion in the *Southwestern Telephone Case*, *supra*, uses the words "Cost of Reproduction" as synonymous with "Replacement Cost." In our opinion this is not a correct interpretation of that decision. It will be noted counsel did not give the complete quotation nor refer to the footnotes. A careful reading of the complete quotation and Note 4, we think, will convince one that Justice Brandeis meant that the property to be reproduced was a new property.

A study of the meaning of the term "Cost of Reproduction New" establishes the following conclusions: (1) The Act contemplates that under this head there shall be stated the cost of reproduction of a *new* property; (2) The Bureau from the beginning has understood and applied the term as referring to a property in a *new* condition; (3) The Commission interprets the Act as requiring it

to report the cost of a *new* property; and (4) The Supreme Court does not regard "replacement cost" and "cost of reproduction new" as synonymous, but means by the latter term the cost of reproducing a property in a *new* condition as it would be built ordinarily.

(2) REPRODUCTION NEW ESTIMATES CONTEMPLATE A PRACTICAL AND ECONOMICAL MANNER OF CONSTRUCTION

Having pointed out that the amount to be reported under cost of reproduction new is the cost of a *new* property, it next becomes important to determine the manner in which the new construction shall be prosecuted.

In the *Texas Midland Railroad, supra*, the Commission states that its cost of reproduction new estimates were arrived at in the following manner:

The engineer making the estimate assumed that the road was not in existence. * * * the engineer then prepared what he conceived to be the most practicable and economical program for the construction of the road.

The Bureau assumes the most rational and practical method of construction and is guided in its theoretical reproduction by the practice that is followed in actual new railroad construction. This record discloses that the usual practice is to open the tracks for operation in their unseasoned condition and bring about gradual solidification under operation. This practice continued down to the

date of the present hearing and is not an obsolete practice abandoned 30 years ago. The only instances where departures from this practice have occurred are found on a few short pieces of line revision or second track work where operating necessities overcame considerations of economical construction. Even in those rare instances, it was necessary to operate at a limited speed for a considerable time after the line had been opened for commercial service.

Witness Saunders, for the Bureau, stated that only in rare instances were lines constructed to be opened at high speed. The cost would be too high and it would not be in accord with a rational construction method. In case of emergency only, or under special conditions is this done. (Tr. p. 6371.) He could recall only one or two instances in his study of cost data. (Tr. p. 6509.) In substance what the Interveners are asking the Commission to do is to reproduce theoretically the railroads in a manner which is not followed in actual practice.

A reproduction of a seasoned track is admittedly impractical and, the record shows, impossible

The Interveners ask the Commission to estimate the cost of reproducing tracks in a manner that their principal witness admits is impracticable. Mr. Kittredge, Chief Engineer of the New York Central, testified that ordinarily the perfected condition of tracks is brought about by the continuous move-

ment of traffic, by the elements and by maintenance in curing defects which appear and that while it is possible to build tracks for high speed operation it has not been done under ordinary conditions by the railroads because the cost is prohibitive. In order that a track might be opened initially for high speed operation he states that the method employed would be to run trains back and forth over the newly constructed roadbed with men constantly engaged in resurfacing. He could recall only one instance in his wide experience as construction engineer where such a method was employed and where a railroad was opened for high speed operation, and that was a stretch of track constructed on the C. C. C. & St. L. in 1904 at the time of the St. Louis Fair.

In brief, counsel makes the assertion that "track not only can be but has been opened originally for operation at high speed" and it is not impossible or even difficult. (Br. p. 12.) Similar statements appear throughout his brief. We challenge the accuracy of this statement and we shall demonstrate in a subsequent part of this brief that this statement is not supported by the facts. The Interveners were able to obtain only a few instances where a line was alleged to have been opened at high speed, and most of these were emergency cases of cut-off or line changes of short mileage. Investigation disclosed, however, that even these "specimens" went through a period of seasoning after initial operation before attaining the required speed. Assuming, however,

that it has been possible to construct short pieces of track for initial operation at high speed, this does not demonstrate that it would be possible to construct an entire railroad in a similar manner.

The question of the practicability of the Interveners' claim should engage the serious attention of the Commission. In another part of this brief there is pointed out in some detail the actual difficulties experienced on those few small construction projects submitted by the carriers where an attempt was made to have the tracks ready at an early date for high-speed traffic. The Interveners' theory assumes that a large amount of time and labor would be expended in tamping and surfacing the ballast and lining the track, and their conclusion seems to be that if this cost is incurred the track which will be produced will be similar in all respects to the tracks which they had on valuation date. Several factors which contribute to the seasoning of a railroad track should be considered in this connection.

There is first a solidification and adaptation of the ballast which lies immediately beneath the ties, some of which is brought about by the expenditure of labor in tamping, and the operation of work trains during construction; secondly, the settling and compacting of the embankment under the ballast which is caused by the weight of traffic and the action of the elements over a period of time; and thirdly, the factor of subsidence which has the ef-

fect of further disturbing and rendering unstable the entire structure of the roadbed. The contention of the Interveners is in effect that a highly finished track and ballast structure is to be constructed initially upon a substructure which for a period of time is, by its very nature, bound to be more or less unstable. No one will seriously assert that it is practicable to perfect the superstructure before the substructure has reached such a condition that its further settlement would not damage the finished surface. The best proof of this position is that the railroads themselves do not ordinarily attempt to perfect their track structure until a sufficient period of time has elapsed to assure a fairly well solidified condition of the subgrade.

The Commission should not be asked to do the impossible or the impracticable in its valuation work. We have no fear that the courts will refuse to support the Commission if it declines to be led astray by the importunities of the Interveners.

A thing is impossible in legal contemplations when it is not practicable, and a thing is impracticable when it can be done only at an excessive and unreasonable cost. *Mineral Park Land Company v. Howard*, 156 Pac. 458.

In the light of the above definition we feel entirely safe in characterizing the claim of the interveners as "impossible."

The amount of traffic does not govern the practicable and economical construction program

Counsel for Interveners takes the position that it would be more economical from the standpoint of the investor to construct a track for high speed and capable of carrying the traffic available on valuation date. No assumptions are made by the Bureau with respect to the traffic in estimating the cost of reproduction new. A theoretical reproduction must be held, as far as possible, within the bounds of reasonableness, and it would be impracticable to determine the cost of reproduction estimates by a consideration of the traffic to be handled. The "practicable and economical construction program" referred to in the *Texas Midland Railroad*, supra, relates to the methods employed in the construction of the line rather than to a direct consideration of the traffic. The amount of traffic handled governs the type of track in existence and thus indirectly is reflected in the cost of reproduction estimates.

If the determination of the amount to be reported for reproduction cost new for Account 12 were to be based on the traffic needs, many difficulties would arise. Under such a theory, it would be just as logical to assume that in a theoretical reproduction the existing plant would not be reproduced, but that a substitute plant more modern and more efficient would be constructed. The railroad systems of the country, as at present constituted,

are the result of a gradual evolution throughout a period of years, and no one will contend that if an entire system of transportation were to be substituted to meet the present needs of traffic a plant similar in all respects to the present plant would be built. If traffic considerations were to determine whether a construction program were economical or otherwise, many portions of existing roads would not be included in our cost of reproduction estimates. In this connection it is pertinent to note the frequent applications of various railroads to the Commission for permission to abandon portions of their lines chiefly on the ground that the traffic is not sufficient to support them. An outstanding example of this is the application of the Boston & Maine for permission to abandon considerable mileage of branch lines. If counsel's argument is to prevail it would seem that the Commission can not justly include in the cost of reproduction estimates for the Boston & Maine, as of present date, any estimate for these lines. Counsel's argument assumes that the traffic available on valuation date utilized the full capacity of the tracks then in existence. While there is nothing to indicate the extent of the utilization, undoubtedly the capacity of many tracks was only partially used and many of them had been constructed to take care of expected business, rather than traffic to be transported as of valuation date.

We do not think that any assumption with reference to the amount of traffic to be handled is neces-

sary in estimating the cost of reproduction. If an assumption is to be indulged in, however, why does not counsel adopt the assumption generally made by carriers? The carriers invariably assume that after a railroad has been brought into existence in a theoretical reproduction, it would be necessary to have a development period for the purpose of securing business. Ordinarily, they assume that they will handle at the beginning of operation only a minor part of the business being transported as of valuation date, the non-competitive traffic. Then they assume that it will be necessary to secure the competitive traffic, or the major portion of their business, by solicitation through a period following valuation date, during which time the roadbed is also becoming solidified.

If reproduction cost new is to be influenced in a major degree by considerations of the amount of traffic waiting to be carried, many insurmountable obstacles would be encountered. It is universally recognized that equipment must become adapted to the service to which it is put, and this requires a certain period of time. Again, of what avail is it to perfect the *track structure* for full service at the very beginning when a considerable period of time must elapse before the solidification and subsidence of the fills have taken place, and before the slopes of the cuts have assumed their natural position and proper drainage facilities have been perfected?

Assuming that it would be possible to perfect the track structure before beginning operation, the solidification and adaptation of the entire physical properties of the carrier would not be sufficiently advanced to permit fullest utilization. The track is only one part of the entire structure, and the entire structure must season before any part of it functions properly. While it might be physically possible, with great expense, to place in high speed operation a short line change or cut-off due to the fact that the remainder of the property is already solidified and adapted, this does not justify the conclusion that it would be possible or practicable to similarly reproduce a system in its entirety. We think that we have sufficiently shown that it is impracticable to determine the cost of reproduction estimates by consideration of the amount of traffic to be handled.

We again emphasize that the Commission attempts to determine the cost of the theoretical reproduction in a practical and reasonable manner. "The cost of reproduction method is of service in ascertaining the present value of the plant, when it is *reasonably applied* and when the cost of reproducing the property may be ascertained with a proper degree of certainty." *Minnesota Rate Cases*, 230 U. S. 452. (Italics ours.)

(3) THE SEASONING OF THE TRACK IS APPRECIATION AND SHOULD NOT BE INCLUDED IN ACCOUNT 12

There is a clear distinction made by the Commission and recognized by the courts between cost

of reproduction new and that element of value known as "appreciation." The Commission, in the *Texas Midland Railroad*, supra, recognized that roadbeds become solidified and adapted after the opening for operation due to the effect of maintenance, time, and operation over the tracks. Such appreciation is an element of value which is to be taken into consideration in determining the final value of the carrier's property. The term appreciation is comprehensive and includes not only the solidification of grading but also the solidification and adaptation of the track and other portions of the physical structures.

By reference to its published decisions, it will be observed that the Commission takes into consideration the element of appreciation in arriving at final value. Counsel expresses doubt whether anything has been allowed for the element of appreciation in determining final value and emphasizes the failure of the Bureau to offer a witness to give information on this point. (Br. pp. 24-26.) A witness for the Bureau was cross-examined at length by counsel as to the amount that had been included by the Commission for this element. Obviously, as the Examiner very properly pointed out, the witness was not competent to state what consideration had been given to that element by the Commission. While the sufficiency of an allowance for appreciation is outside of the scope of this inquiry, it seems to us that it must be presumed

that the Commission has given actual consideration to that element (which counsel doubts) unless it is assumed that the Commission has not acted in good faith in reporting the basis of its conclusions as to final value.

In brief, counsel advances another novel idea that the term "appreciation" referred to by the Commission does not include the perfecting or the seasoning of the track but includes only the solidification of the *grading*. Counsel attempts to support his interpretation of what the Commission understands by the term "appreciation" by citations from the *Texas Midland Railroad*, and by reference to the N. Y. P. & N. decision. (Br. pp. 26-28.) A careful inspection of the Commission's decisions will convince one that the solidification of the tracks is included within the term "appreciation." In the *Texas Midland Railroad*, *supra*, at page 131, the Commission in discussing what is included within appreciation and what happens when a railroad is put into operation, states: "Soft spots develop in the embankment and in order to maintain *alignment of the track* additional ballast and sometimes earth must be applied." In the *N. Y. P. & N. case*, *supra*, at page 298, the Commission in dealing with appreciation definitely refers to appreciation as being the seasoning of the *roadbed and track*. In other decisions, similar statements can be found which show clearly that the Commission refers to the seasoning of the tracks as a part of appreciation.

Counsel seems to be alone in his interpretation of what is meant by appreciation. All carriers so far as we know have interpreted the Commission's use of that term in the manner in which we have used it. In attempting to prove the so-called costs of solidification or appreciation, the carriers have attempted, as pointed out in the *Texas Midland Railroad*, *supra*, to determine the excess cost of maintenance during the early years of operation. An examination of these studies will disclose that by far the major portion of such expenditures was for resurfacing, relining and otherwise curing defects in the track. The other work such as cleaning out ditches, repairing banks due to slips and slides, etc., has been a minor part of such excess maintenance. We think that it is established beyond question that (1) the solidified condition of the track is appreciation, and (2) that such appreciation is considered by the Commission in determining final value.

The failure of the Presidents' Conference Committee heretofore to state clearly its principles has been misleading

Something has already been said about counsel's statement that the Commission "appeared to be ignorant" (B. & M. Br. p. 136) of the kind of track being priced by the Bureau. This suggestion we have conclusively shown is unfounded. In fact, we can not fail to point out that if any confusion has come about, it has been due to the Interveners or the carriers whom they profess to rep-

resent. This is the first occasion where there has been a clear declaration of principle, and not until now has it been disclosed that they are proposing that the cost of reproduction new of the tracks be estimated in their present seasoned condition.

Many carriers have used Formula F to support their claims for cost of reproduction new for Account 12, and at the same time, have asked for an additional sum for deferred track construction, another name for the alleged cost of solidification. This action would lead one to believe that the Formula is to be used as a means of estimating the cost of reproduction of tracks in a condition similar to that assumed by the Bureau.

We now find, however, that Formula F, like the present pricing schedule, was intended to reproduce the seasoned tracks as they existed on valuation date. When the formula was applied to reproduce a track at the speed operated on valuation date, there was no room for the inclusion of any additional cost as deferred track construction, since the tracks on valuation date included the seasoning. The deferred track construction costs or excess maintenance costs in connection with the compacting due to the trains and the action of the elements would have further increased the speed resulting in reproduction of a track capable of much greater speed than the one in existence on valuation date. Thus there was a duplication of claims, and this was not called to the attention of the Commis-

sion. We do not believe that the carriers fully realized the effect of their claims under Formula F, but there is no denying the fact that they were most extravagant.

The element of appreciation is sought in many ways and involves duplication

We have pointed out heretofore the apparent failure of the Interveners or the carriers in the past to state the full scope of their claims under Account 12. We cannot omit calling attention to the fact that the present position taken by the Interveners involves several duplications which cannot under any theory of valuation be justified.

What the Interveners are in reality asking for is that the estimated cost of appreciation be included in reproduction cost new estimates for Tracklaying and Surfacing. The same principle is involved here as was involved in Formula F, the only difference being that a new method has been adopted which produces results not far different. The claim for an additional amount under Account 12 in the present pricing schedule for intensive surfacing and seasoning of track is in essence nothing more than a duplication of other contentions made under different headings in practically every valuation case before this Commission. Such claims as those for appreciation, going concern value, development cost and deferred track construction cover some of the elements included in the present demands. However, we find no abandonment of

these claims and no indication that the carriers will attempt to eliminate these duplications.

The carriers invariably contend that the Commission has failed to comply with the Act because it does not state the value of appreciation as a separate sum. One of the means suggested for measuring such appreciation is the excess maintenance required during the early years of operation; yet, if in accordance with the present claim the Commission were to provide for the cost of reproducing the track in the condition in which it existed on valuation date there would be no room to give any consideration to the element of appreciation of track.

Whatever cost is incurred in bringing about this appreciation is of necessity incurred at the uppermost part of the track structure. Any subsidence, solidification or movement of any part of the roadbed structure is immediately reflected in the surface and alignment of the rail. The only way in which the defect can be remedied is by the application of material and the expenditure of labor in resurfacing and relining the track. It can readily be seen, therefore, that track expenditures necessarily comprehend many costs which are incurred in bringing about appreciation, and the present claim of the Interveners, beyond any question, includes a large amount of such costs. The present position of the Interveners with reference to Account 12 and the carriers' contentions for an allowance under appreciation obviously can not stand together.

At the same time, carriers are asking that the development costs or losses during the early years of operation be capitalized. These losses are in part at least occasioned by the costs of seasoning or solidifying the new roadbed. Thus the same element is again sought in another form in the same proceeding.

Separate claims are made by many carriers for what is denominated the cost of development of physical property. This contention assumes that the property for which cost of reproduction is set out is a new property and that an additional amount should be included in the final value to take care of bringing this property to its condition on valuation date. The cost of "deferred track construction" is also claimed by a number of carriers. These two claims are duplicated by the present demands of the carriers' committee.

No carrier, as far as we are able to ascertain, has failed to make a claim for a value as a going concern and an essential element of this claim is always the ability of the carrier to handle its traffic well. The carriers usually attempt to measure going concern value by the assumption of a development period to commence at the beginning of operation and cover a period of from four to six years, during which they assume that the physical properties are being developed and the roadbed is becoming seasoned and solidified. Here again the carrier is asking for the same element in a different form.

The facts seem to warrant the conclusion that an attempt is being made to obtain allowances for the same element of value in several different ways. We confidently believe that the Commission will not for a moment countenance the attempt of the carriers to obtain several allowances for the same elements of value under the guise of different appellations.

**The effect of accounting on the cost of reproduction
new estimates**

Substantially all the railroads have been opened for operation with unseasoned tracks and roadbeds and through natural processes brought up to their present seasoned condition. This is the normal manner in which railroads are constructed. The seasoning took place after the track was opened for operation and was brought about through natural processes and by maintenance work which was charged to operating expenses and has been paid for out of rates by the public. These expenses were necessary for the safe and economical operation of the road. All items of physical property are included in the inventory and priced in the cost of reproduction estimates without regard to the source of the money used to purchase them. The solidification or seasoning, however, does not create a distinct item of physical property that can be inventoried, but only changes the condition of existing physical property. For that reason, nothing can be included for appreciation as such in Account 12.

This is true not only as to the solidification which has historically occurred, but also would be true under any reasonable theory of reproduction. We have heretofore stated that the Bureau in arriving at its cost of reproduction estimates assumes that the track will be reproduced in a rational and practical manner as is the practice in normal railroad construction. It is likewise assumed that appreciation or seasoning would take place in the future, as it has in the past, through natural processes and by the application of maintenance charged to operating expenses.

From the standpoint of the principle involved, the fact that the expense of seasoning has been paid for out of operation has had no effect in the determination of the cost of reproduction new estimates. The main question to be determined is whether or not in estimating its cost of reproduction new, the Commission is assuming a reproduction program that is rational and practical. Undoubtedly in many instances the reproduction program would not correspond with the historical development of the tracks being reproduced. Many tracks were originally placed in operation in a condition inferior to that assumed by the Bureau in its reproduction estimates. No attempt is made in such a case by the Bureau to reflect in its reproduction estimate the historical conditions surrounding the construction of that track. The implication suggested by counsel that nothing is included in the

Bureau's estimate which historically was charged to operation is, of course, erroneous. The fact that part of the property was paid for out of operating expenses does not prevent its inclusion in the reproduction new estimates.

Counsel is in error as to the Bureau's position and the testimony with reference to this feature. In brief, at page 19, counsel says:

It is argued that this provision (par. a of Section 19a) forbids the inclusion in the inventory of any property which was paid for out of operating expenses and that since in many cases the carrier's track was opened at 15 or 20 mile speed, and brought up to higher speeds during a period of years thereafter, and the cost subsequent to the opening for operation was charged by the railroad to operating expenses, the Act itself forbids the Commission to price the track at what it would cost to produce tracks of higher speeds.

And again at page 20:

The Bureau interprets this sentence to be a requirement of Congress that only expenditure actually charged to capital account can be included in the cost placed on the items of property in the inventory.

No such contention was made. We have sufficiently set out above the Bureau's position.

Counsel also discusses two hypothetical pieces of track construction in order "more clearly to understand" the Bureau's contentions. (Br. p. 18, 19.)

These illustrations are confusing. In the first place, Witness Saunders was referring to the amounts that would be charged to original cost in the investment accounts; secondly, irrespective of the manner of construction, the cost of reproduction new estimates for two pieces of track similar in all respects on valuation date are the same; and thirdly, the assumption made in brief that the two pieces of track would be priced in the engineering report at \$2,000 per mile is without support of record. There are other erroneous statements with reference to the influence that the original accounting has had on the Bureau's cost of reproduction estimates.

The brief of counsel leaves the impression that the Bureau's reproduction estimate for Account 12 in every case is affected in a major degree by a consideration of the amount originally charged to capital account for tracklaying and surfacing. The question of the original accounting has no influence upon the matter. The Bureau's prices are judgment figures applicable to a rational reproduction program and are arrived at after a consideration of all available data.

Witness Saunders for the Bureau discussed the question of accounting in his testimony, but referred to that question in connection with cost data and appreciation. The question is vitally important in considering the cost data presented by the

carrier and will be discussed later in that connection. It should be clearly understood that our statement that charges to operating expenses do not influence reproduction cost new estimates does not apply in *testing* the cost data for reasons which we will later explain. The subject is also important in considering the element of appreciation. The Commission discussed that question in the *Texas Midland Railroad, supra*, at page 68, and we think it proper in considering the element of appreciation to ascertain where the money came from. However, the amount to be allowed for appreciation, if any, is not properly within the scope of this inquiry.

CONCLUSIONS

We think it is clearly established that the Commission is correct in the position which it has consistently taken, that the cost of reproduction new should relate to the cost of a *new* track constructed in the manner in which railroads are usually built, and that the Commission is correct and should adhere to its past practice of considering the seasoning of the track as appreciation rather than as a cost to be reported in Engineering Reports. The evidence conclusively shows that it is impracticable and even impossible to reproduce the tracks in their present solidified state.

II

THE PRICING SCHEDULE PRESENTED BY THE INTERVENERS IS ONLY A METHOD OF ESTIMATING THE COST OF SEASONING; IT IS ERRONEOUSLY CONCEIVED AND IMPROPERLY BUILT UP; THE COSTS UPON WHICH IT IS BASED ARE INACCURATE; THE MAJORITY OF THE PROJECTS ARE NOT COMPARABLE TO A THEORETICAL REPRODUCTION; AND THE DATA ARE INSUFFICIENT TO SUPPORT THE CONCLUSIONS DRAWN

Under this heading the discussion will deal with the general phases of the projects, summaries and pricing schedule presented by the Interveners. A brief analysis of the cost data will be made in a subsequent part of the brief where we will show that the costs here reported can not be used to support the estimated cost of tracklaying and surfacing either on the Bureau's theory or the Interveners'. The pricing schedule is designed to estimate the cost of bringing the track to its seasoned condition on valuation date and is to be used as an additive to the Bureau prices for tracklaying and surfacing. No direct application of the data was made in the summaries to the same track in the condition assumed by the Bureau. In view of these facts our comments both upon the schedule and the costs will not be exhaustive, but we shall content ourselves in pointing out the fundamental defects.

At the outset, we feel it necessary to call attention to the attitude of the Interveners as to their

data. Although errors were admitted by some of the witnesses and improper charges and questionable items demonstrated during the progress of the hearing, the Interveners, except in a few isolated cases, made no corrections and resolved all doubts in favor of the accuracy of the cost data. The summaries from which the pricing schedule was developed make use of the reported costs of the projects as set up in the individual exhibits *with no alterations or corrections*. Assuming that the methods adopted in the compilation of the summaries were correct in every detail and the projects were representative of theoretical reproduction, nevertheless, the fact that the costs used are so clearly erroneous makes the conclusions carry no weight whatsoever. The Interveners in brief lamely attempt to excuse the failure to make any corrections in the reported costs on the ground that time was not sufficient and that the inclusion of erroneous items *may be* offset by the failure to include other items which are proper charges to Account 12. This attitude on the part of the Interveners of failing to make corrections and eliminate charges which are improper and extremely doubtful is in sharp contrast with the attitude of the Bureau. Mr. Saunders, the Bureau's witness, repeatedly announced that the Bureau would revise and correct its exhibits so long as any errors could be discovered.

The cost studies were tabulated and a pricing schedule developed

Following the testimony of various witnesses in support of the reported costs for the 149 projects, the Interveners introduced summaries from which they developed a pricing schedule. These summaries were made and presented by Mr. O'Brien, an engineer statistician for the Eastern Group. His studies in developing the summaries and the pricing schedule were purely clerical under the sole direction of counsel. Counsel instructed Mr. O'Brien as to the exact manner of preparation of the summaries and the schedule and also the particular projects to use and those to omit. Mr. O'Brien received no instructions from any member of the subcommittee. As the Interveners failed to offer any member of the subcommittee to testify with respect to the pricing schedule, the Bureau called as its own witnesses certain members of this committee. It appears that although these members had charge of the presentation they had formed no opinion as to its results. The hearing was not closed until several weeks later, but no member of this committee was offered to aid the Commission with the benefit of his expert opinion on the new pricing schedule. Thus the present pricing schedule is offered without the expressed sanction of the engineers forming the very committee which had immediate charge of the entire study. There is no expert opinion supporting the

manner of its application or the soundness of the method by which it was built up. The only opinion witness for the Interveners, Mr. Kittredge, Chief Engineer of the New York Central Lines, although agreeing with the general tendency of the pricing curve, would not vouch for its accuracy and disagreed with it to the extent that he would expect a lower curve for tracks capable of operation of speeds up to 50 miles and a higher curve for the higher speed tracks. (Tr. p. 6197.) We can only speculate why the members of the committee were not placed upon the stand. Perhaps there is a similar disagreement as to the present pricing schedule as was the case with Formula F.

The Interveners purport to accept Memorandum 733 maximum prices for placing ballast and the engineering report prices for specialties and track-laying and surfacing as being sufficient to include all the basic costs in Account 12 through the period of tracklaying and surfacing up to and including the placing of the ballast. These basic costs are then deducted from the total reported costs. The remainder or the excess costs, which are alleged to have been incurred after the ballast has been placed, purports to represent the cost of building up the track so as to sustain the maximum permissible speed authorized. This excess is denominated surfacing, lining and maintenance during construction. The projects are grouped by speeds and the excess cost is converted into a price per mile schedule graduated in 5 mile speed intervals. The In-

terveners contend that the sums derived from this schedule should be added to the engineering report prices for tracklaying and surfacing. This is nothing more or less than an attempt to estimate the cost of seasoning. The contention that the maximum prices in Memorandum 733 for placing ballast should be used will be discussed later.

The additives, as set out in the pricing schedule, are as follows:

	Per mile
For 10-mile track.....	\$65
For 15-mile track.....	140
For 20-mile track.....	220
For 25-mile track.....	295
For 30-mile track.....	390
For 35-mile track.....	470
For 40-mile track.....	565
For 45-mile track.....	660
For 50-mile track.....	755
For 55-mile track.....	835
For 60-mile track.....	930
For 65-mile track.....	1,025
For 70-mile track.....	1,120

In this chapter we shall show that (1) the construction projects are so unrepresentative of theoretical reproduction that they should not be used to develop reproduction prices; (2) the pricing schedule is erroneously conceived and devised; and (3) other defects render the method advocated valueless.

(1) THE CONSTRUCTION PROJECTS ARE SO UNREPRESENTATIVE OF THEORETICAL REPRODUCTION THAT THEY SHOULD NOT BE USED TO DEVELOP REPRODUCTION PRICES

After making certain omissions, there remain 78 projects which have been used to develop the pric-

ing schedule. The Interveners have, however, included as separate projects in four cases the side tracks constructed for main line projects already included (Ex. 290, 356-s, 357-s, 361-s), so that there are really only 74 separate cost projects used. Most of these should not be used as cost data because of the character of construction work.

The following classes of projects are not representative of reproduction conditions and are ordinarily not useful in determining reproduction costs:

1. Line changes;
 2. Additional track work;
 3. Projects less than 10 miles in length;
 4. Yard track projects;
 5. Piecemeal or patchwork construction.
- (Tr. p. 6738.)

In Appendix 1, attached hereto, there are shown the 43 projects out of the total of 74 which fall within the above classes and should be omitted for the reasons indicated.

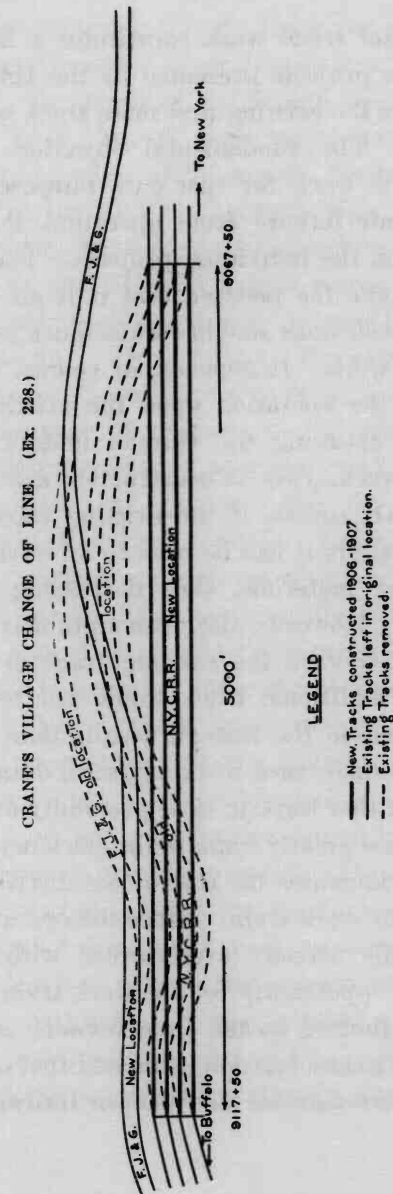
Counsel attempts to justify the inclusion of these improper data. (Br. pp. 46-48.) Except for this, it would seem unnecessary to give detailed reasons why this character of cost data is not comparable to reproduction of a whole line of railroad. The mere mention of projects such as line changes, additional tracks, short projects, and projects built in short pieces is sufficient of itself to show that there is no comparability with the construction of a railroad as a whole. It seems logical and reasonable that

work of the nature above mentioned would generally be more expensive than work carried on under a reasonable, economical and efficient construction program of tracklaying for an entire railroad. (Tr. pp. 6387-6388.) However, in view of the emphasis placed upon the usefulness of these data, it will be necessary to discuss them more at length.

Line Revisions.—Line revisions of existing tracks are generally of short mileage and are found for the most part on 2, 3 or 4 track lines where the high speed and heavy traffic require the best possible track at a very early date. In work of this nature the primary consideration always is to insure the uninterrupted movement of commercial traffic regardless of the effect on the cost of the new work. To construct the new track cheaply and economically is a secondary consideration which must be subordinated to the requirements of traffic on the division. With this in mind, it will be seen that tracklaying and surfacing on revision work is not necessarily carried on in a manner or with an expense which would be typical of any construction where the exigencies of the operated line were not controlling. It may well be that the expense of the revision work is kept as low as possible *under the condition which existed* when the work was done, but there can be no question that the conditions existing in the actual construction of this class of work as performed historically would not be present in a theoretical reproduction of the same property at a single impulse.

The cause of the greater expense of revision work is not difficult to find. There are numerous connections to be made between the new track and the old operated track, and the expense of installing these connections under interference from traffic is extremely great. In all of the projects of this class submitted there are a relatively large number of such connections as compared with the mileage of new track reported, with the result that the per mile cost of the new construction is highly inflated. In a number of cases the alignment of the new track lies partly across the existing operated roadbed or crosses it several times between the limits of the mileage reported. It requires no argument to make it plain that construction of this sort is subject to a maximum of interference from operated traffic, and there is no similarity whatever to the situation which would be encountered in the reproduction of the same tracks.

On the opposite page there is shown a sketch of the Crane's Village change of line, a New York Central project (Ex. 228), which illustrates the class of line revisions presented in this proceeding. This diagram shows the position of the new tracks with the relation to the existing operating tracks of the main line of the New York Central between New York and Buffalo. With four exceptions, all of the work reported by the Interveners as having been constructed for an initial speed of over 40 miles per hour is work of this character.



Additional track work constitutes a large portion of the projects presented by the Interveners. In all cases the existing first main track was under operation. The fundamental objection to additional track work for cost data purposes is that there is interference from operation, the degree differing on the individual projects. The Bureau does not take the position that it is an infallible rule that such work should cost as much as or more than new work. It depends, of course, upon the extent of the operation upon the existing track. Generally speaking the Bureau finds from cost data that such types of construction are more expensive. Of course, if the existing track is free from operation, it can be used to an advantage in distributing materials, thus decreasing the cost somewhat. However, the presumption is that the traffic is heavy on the existing track or else the second or additional track would not be needed. For this reason the Bureau usually does not consider additional track work as useful data. There is no doubt that work in close proximity to a busily operated line greatly impairs the efficiency of labor as well as increases the cost of the distribution of materials by work train. Since the operated track is ordinarily already overcrowded with revenue trains, the opportunity for the work train to use it would be limited to the time between scheduled trains. Witness Johnson estimated that on second track construction on the Wabash Railway where

the traffic was comparatively light, the work train had to spend one-half of its time on a siding. (Tr. p. 4578.) On the third and fourth track work on the New York Central, work trains were kept off the track entirely during certain hours. (Tr. p. 6210.) On the division between New York and Albany there were over 100 schedule passenger trains daily and 20 or 30 freight trains with some of the regular passenger trains running in as many as 14 sections. (Tr. p. 6211.) The experience of other railroads is similar but in varying degrees.

On a number of projects the additional track was cut into the existing operated track every few miles in order that operation over the new track might begin as early as possible. The cost of making these various connections under traffic is included in the studies and naturally increases the per mile cost of tracklaying and surfacing beyond what would be expected under theoretical reproduction. Additional track work also involves the changing of existing turnouts to industrial tracks and branch lines. The conclusion is inescapable that the delay and interference caused by commercial traffic must operate to increase the cost.

Mr. Kittredge testified for the Interveners that in his opinion additional track work was less expensive than new work. His opinion was not supported by cost data. *It is significant that he was silent as to the relative cost of line revision work.* The weight to be given his testimony can be judged

by his further statement that there would have to be 100 trains per day over the existing operated line before second track work would be more expensive (Tr. p. 6212), or a train approximately every 6 minutes on the average. At the same time he testified that work trains had to leave the track 20 minutes ahead of the "Twentieth Century Limited."

There can be no question that work done under operating conditions is more costly than new work. There is no way of measuring the added cost of the impaired efficiency of labor, or the increased cost of work-train service, but some idea of the extremely high cost of making connections under traffic, one factor in the increased cost, may be gained from the Haddon Heights to Magnolia project of the Reading Railroad. (Exhibit 306.) This is a third main track 2.7 miles in length and was connected at both ends with an operated track. (Tr. p. 2461.) This is the so-called "man hour" study made in 1922 where "a careful and accurate record was kept" of the hours the men were engaged in each process of tracklaying and surfacing. (Br. p. 61.) The total cost of the track construction was \$27,000. The carrier eliminated the "accurate" costs of making the connection with the existing operated track at each end amounting to approximately \$8,000. The cost of the construction work between the ends was \$19,000. (Tr. p. 2447.) Therefore, the cost of making connections with existing tracks

was approximately 30 per cent of total costs of the entire track construction.

Yard Tracks.—A number of projects consisting chiefly of yard track construction are included in this presentation. In essence, this work is similar to short line construction (Tr. p. 6192) and it is, therefore, subject to many of the same infirmities as cost data. Witness Saunders stated that, based on his study of costs of all kinds of projects, cost data generally shows a per mile cost for tracklaying and surfacing in yard work higher than cost on new lines. He said:

In general the yard track data that has been presented to the Bureau for consideration is a development of a yard on the basis of the necessities of operation and the cost data reflects an interrupted construction, the construction taking place piecemeal and interfered with by operating lines throughout the yard. (Tr. p. 6383.)

We do not mean to leave the impression that yard tracks as such should cost more than new construction but there can be no doubt that the cost of yard track work as historically performed, is ordinarily in excess of the costs that would be encountered in reproducing the existing yard at a single impulse. This observation is borne out by many of the yard track projects presented in this case. The construction of yard tracks as historically performed usually extends over long periods,

the tracks being put into operation at various dates as soon as completed.

Short projects.—Many of the projects consisting of new work are of comparatively short mileage. The Bureau does not consider projects less than 10 miles in length as good cost data and about one-quarter of those here fall within that class. The testimony of witness Saunders, as well as carrier witnesses, demonstrates that short projects are not useful as a guide to reproduction costs. Counsel relies on the testimony of Mr. Kittredge in support of the contention that construction projects less than 10 miles long are no more expensive than longer ones, but this witness went so far as to say that a track $\frac{1}{4}$ mile in length is not more expensive. However, another eminent engineering witness for the Interveners, Mr. Churchill, Vice President of the Norfolk & Western, stated that he did not regard construction projects less than 8 or 10 miles in length as comparable to original construction and that he did not think them enlightening or useful. For that reason, he did not report the costs of small jobs on the Norfolk & Western. (Tr. p. 2362.) Although Mr. Kittredge testified that a line $\frac{1}{4}$ of a mile long would cost no more per unit than a larger one, counsel omitted from the summaries the Lake Mahopac branch, a New York Central project (Ex. 235), 1.26 miles long as being "very short mileage." Either counsel had some doubt as to the soundness of Mr. Kittredge's opinion or wanted to show some

slight deference to Mr. Churchill. Counsel quotes Mr. McFetridge, Engineer of the Bessemer & Lake Erie, as having testified to the same opinion as given by Mr. Kittredge. (Br. p. 51.) To say the least, this is the most favorable interpretation of his testimony. Mr. McFetridge later said, however, that it would take the same time to get a gang organized, to get them working well, and to assemble the equipment for a small job as for a large job. (Tr. p. 2041.) The testimony of Interveners' witnesses fails to support counsel's contention.

Another characteristic common to a number of jobs presented in this case is that the new track was laid in short sections as soon as the grading was partially completed and used as a construction track to widen the banks and cuts. Under this type of construction tracklaying becomes merely incidental to the grading work and is prosecuted in a manner advantageous rather to the general construction than to the economical progress of the tracklaying itself. Illustrations are the three projects on the Bessemer & Lake Erie. (Ex. 270-272, inclusive.)

An objectionable feature of certain projects is that they were constructed piecemeal. A number of the longer projects were built in several parts at different dates so that for all practical purposes they must be regarded in the same light as the shorter jobs. An illustration of this type is the Poughkeepsie to Hyde Park, a New York Central

project (Ex. 241), which was in reality a combination of three separate projects constructed at different times within the period 1913 to 1918, inclusive, of 9.34, 5.79, 3.28 miles, respectively, and a small mileage of side tracks.

Most of the new construction projects are not useful cost data for reproduction estimates

There remain 31 projects of new work over 10 miles in length. It may safely be said that of all the new work presented by the Interveners there are very few projects which, in size and in manner of construction, fairly represent reproduction conditions. The reason for this is that there has been very little new construction work in eastern territory since 1900, other than addition and betterment work.

Another objection to the manner of construction found in a few projects is the fact that the newly constructed line lay idle for a time before the beginning of operation. As an example, there might be cited the Lake Erie & Pittsburgh Railway (Ex. 361), where there was an interim of one year between the completion of the work and the beginning of commercial service, and where substantial charges for resurfacing the track are included in the construction cost. Most of these charges are occasioned by the necessity of rehabilitating the track after it lay idle for a long period.

Mr. Saunders also testified that the cost of projects should not be used where construction progressed at a very slow rate, as well as jobs where there were unusual delays. On most of the projects the progress of tracklaying and surfacing was extremely slow. This fact operates to increase materially the cost of many of the items included in Account 12, such as rental of equipment and camp cars and the cost of maintenance during construction on portions of the track completed before the remainder. Mr. Saunders testified that under normal conditions the rate of progress should be a mile a day. Mr. Kittredge testified that the rate of progress under ideal conditions should be a mile a day. Mr. Kittredge testified that the rate to increase the costs in the same manner.

The cost data supporting the pricing schedule for the higher speed tracks

As heretofore stated the Interveners' pricing schedule is developed on the basis of a cost per mile for intensive surfacing for speeds ranging from 10 to 70 miles per hour, and is to be used as an additive to the Bureau prices to cover what we have shown is the equivalent of "seasoning." The upper range of the schedule would be applied to most of the mileage as the majority of the main line tracks in the Eastern Group territory are capable of sustaining speeds in excess of 40 miles per hour. For that reason it is particularly important to make a more careful examination of the

manner in which the pricing schedule for tracks over 40 miles an hour is developed and the data upon which it is based.

We will show that (1) the data are insufficient in amount, (2) the projects used are wholly incomparable to the reproduction of a railroad, (3) the claim that they are opened initially for high speeds is not supported, and (4) costs during operation were included.

The data used in developing this part of the schedule is of the flimsiest kind imaginable, there being *only 10 projects* and these are of a character which makes them unworthy of use. Doubtless the Interveners presented all such data that they were able to secure. Sound engineering practice has shown that in the development of any curve or schedule the greater number of points which are applied, the more accurate will be the result. A list of the projects over 40 miles an hour used in developing this curve and other pertinent information concerning them are set forth in Table I.

TABLE I
PROJECTS USED TO DEVELOP SCHEDULE FOR OVER 40 MILES AND UP TO AND INCLUDING 60 MILES

Project	Carrier	Road miles	Main and side track miles	Kind of work	Average speed used in pricing schedule	Actual initial speed, m. p. h.	Intervening period
Goldens Bridge-Brewster	N. Y. C.	7.26	9.36	Second track	42.37	25	6 mos.
Marble Hill Out-off	do.	.73	2.92	4 track line change	60	20	9 mos.
Nepperhan-Ardsley	do.	3.61	3.61	Second track	45	15	1 1/2 mos.
Newfield-Atlantic City	P. R. R.	35.00	35.00	do.	48	No data	4 mos.
Carlisle-Gresson	do.	9.48	11.68	Line revision	59.64	10 to 30	(1)
Uniondale-Simpson	Erte	7.99	8.91	Second track	54.26	15 or 20	Over 1 year.
Indiana Harbor-Millers	N. Y. C.	11.34	22.98	Line revision	60	No data	3 mos.
PROJECTS USED TO DEVELOP PRICING SCHEDULE FOR OVER 60 MILES PER HOUR							
Duncannon-Aqueduct	P. R. R.	3.03	12.10	4 trk. line revision	70	(2)	No data.
Granville Bridge-Mayes Bridge	do.	2.25	9.00	do.	70	(2)	Several months.
New York Short Line	Reading	9.38	21.14	Line revision	73.16	(2)	No definite data.

¹ 40 m. p. h. permitted after six weeks.
² "Reduced speed until settled."

³ 30 m. p. h. over Granville Bridge.
⁴ From time-table schedules.

It will be seen that Interveners have only seven small projects to develop their pricing schedule for tracks capable of speeds of 40 to 60 miles per hour, the group which probably includes the greater part of the main track mileage in the Eastern territory. For tracks capable of speeds above 60 miles per hour there are only *three* projects. Even assuming that the nature of the work were comparable to reproduction and that the costs were accurate in every particular, these few jobs are insufficient in number to form a basis for a pricing schedule. We shall show now that because of the *character* of the jobs no consideration can be given to the schedule developed from them, and in a latter part of the brief that the *costs* of these projects can not be relied upon.

Of these ten projects, four are new second track and the remaining six are line revisions or short cut-offs between two sections of very high speed track. Three of the second tracks, namely, the Goldens Bridge-Brewster, Nepperhan-Ardsley, and Uniondale-Simpson projects are very short and involve expensive connections at each end with the existing operated track. Several additional connections were made on the Uniondale-Simpson project, as the new second track was cut into the existing operated track at intervals. We have already called attention to the "man-hour study" on the Reading (to which the Interveners "point with pride" as being accurate in every particular)

where it was found that the cost of making two connections with the existing operated track amounted to approximately \$8,000 or 30 per cent of the total costs. Full information regarding the fourth second track job, the Newfield to Atlantic City line, could not be secured from the witness, and furthermore many items of the cost must be questioned.

The remaining six projects are all in the nature of revision work or short cut-offs on high-speed lines and in no case involve mileage of any appreciable length. The mileage stated on the various exhibits is in track miles and where there is a revision of four tracks as in the case of the Duncannon to Aqueduct job, for instance, the length of the project is one-fourth of the track mileage, or three miles. Most of the line revision work was done on four-track high-speed lines requiring connections to be made under operation with each of the four tracks at both ends of the new work and in some cases additional connections at various other points between the limits of the work. It is evident that this type of work was carried on with a great amount of interference from operated traffic. This feature is so important in considering the Interveners' pricing schedule that a brief description of each project is given.

Marble Hill Cut-off—(N. Y. C. Ex. 236).—This is a short cut-off on a high-speed passenger line, 2.92 miles of all tracks. It has four tracks for the

greater part of the distance so that the roadway mileage is only about three-quarters of a mile. This work was only about nine miles from the Grand Central Terminal in New York City and the main lines which were being straightened out, of course, carried extremely heavy traffic. At one end it was necessary to make four connections with existing operated tracks and at the other, two connections. It is obvious that this project is not good cost data.

Carlisle to Greason—(P. R. R. Ex. 301).—This is a main-line revision job covering 9.48 miles of main line and a passing siding 2.2 miles long. The new track eliminated an "S" curve and crossed the old line in the middle at two different points. (Ex. 301a.) Some change in grade was involved in this construction. (Tr. p. 5131.) In addition to the connection at either end with the existing operated line there were also intermediate connections where the new line crossed the operated track as the new track was placed in operation in sections. A job of this nature involving a line revision and grade changes, requiring a number of connections with an operated track and placed in operation at various times as parts of the work were completed is certainly far removed from conditions which would be encountered in a theoretical reproduction and undoubtedly operated to greatly increase the cost beyond normal.

Indiana Harbor to Millers—(N. Y. C. Ex. 356).—This is essentially a relocation or revision of the

main line of the New York Central (West). Some mileage at either end of the project was relocated and the middle section was reconstructed on the same location for a distance of 4.6 miles. Traffic, however, was detoured over part of the distance and only .959 of a mile was relaid under traffic. As this is the main line of the New York Central, traffic was extremely heavy, 83 trains using the existing operated track every day. The delays caused by interference from traffic are impossible to estimate. (Tr. p. 5760.) This project like others required the making of double track connections with the operated line at four places at least and the expense is tremendously increased in consequence. This is another instance where operating necessities for maintaining schedules overcame practical considerations as to the manner of construction.

Duncannon to Aqueduct—(N. R. R. Ex. 293).—This project, only about three miles long, covers a four-track revision job built to eliminate grade crossings and to improve alignment of the track in the town of Duncannon. The sketch of this job (Ex. 293a) indicates that the new line parallels the old line part of the distance and perhaps crosses it. The witness thought that the new line was right up against the old track and that the center line of the four-track roadbed intersected at several places. (Tr. p. 4936.) Each track was opened for operation in various small sections. (Tr. pp. 5009–

5010.) A number of temporary connections with the busily operated old line were necessary in addition to the eight permanent connections at the ends of the new work, all of which would have an influence in tremendously increasing the cost. The witness was not sure but that this project may also include some "throwing track." (Tr. p. 5003.) It is perfectly obvious that a short piece of line-revision work straightening out busily operated track where it is absolutely essential to maintain fast passenger schedules is not proper to use as cost data for estimating reproduction costs for the railroads of the entire country.

Granville Bridge to Mayes Bridge—(P. R. R. Ex. 295).—This project is a line-revision job on the four-track main line of the Pennsylvania between Harrisburg and Altoona and is only about two miles long, including nine miles of all tracks. Eight connections had to be made with the four existing operated tracks at both ends. The exact number of trains using this track could not be ascertained, but it is safe to say that the number was very large and that the cost of connecting new tracks to the operated line would be extremely expensive. This is another project which must be rejected as being of no use as cost data for reproduction estimates.

New York Short Line (Reading Ex. 305).—The witness who presented this was not familiar with the manner in which it was constructed. It is a

double-track line, about 9 roadbed miles in length, built just outside Philadelphia for the purpose of straightening out the alignment on the main line of the Reading between Philadelphia and New York. The connections with the operated line at one end were made under traffic, which must have been a very costly piece of work on account of the interference. This certainly can not be regarded as a representative project.

These ten projects were not opened for high speed initially

Another important consideration in discussing these so-called high-speed tracks is the manner in which the reported speed was attained. The Interveners would have the Commission believe that these new tracks were placed in operation at high speed initially. But such is not the case. It should be remembered that these were the only so-called high-speed tracks which the Interveners could secure as cost data and were instances where it was absolutely essential that the new tracks be quickly developed. But even these were not put into commercial operation initially at the high speeds reported.

The Bureau was unable to obtain in all instances the train bulletins placing the new tracks in operation. But in every instance where the history of the operation of the track could be traced, it was found that operation began at a lower speed, which

at subsequent dates was increased with perhaps temporary decreases until the schedule speed of trains over the division was permitted on the new tracks. A considerable period of time was required before the trains were permitted to operate at scheduled speed. This point is important in connection with the Interveners' claim that it is possible and practical and not even difficult to open lines for high speed operation. An analysis of those projects where reliable information as to initial speeds was obtainable demonstrates that, contrary to the Interveners' claim, even these few construction projects were not opened at the claimed speed, and that the speed was brought up by a process of gradual development. This development, to be sure, was forced artificially, being brought about only in part as the result of a natural process of seasoning in the normal way. A brief review of these 10 projects explodes the myth regarding high initial speed.

Goldens Bridge to Brewster.—This project is included in the summaries at a weighted average speed of main and side tracks of 42.37 miles per hour. The speed for the main track is shown at 50 miles per hour. The record discloses, however, that this speed was not attained until more than six months after the beginning of commercial operation. The line was opened for operation on June 14, 1907, and 25 miles per hour was first permitted. This speed was increased from time to

time thereafter until October 12, when it was reduced to 15 miles per hour. Between October 15 and December 23, 30 miles an hour was permitted and on December 23 the maximum permissible speed of 50 miles was put into effect. This project presents an illustration of the impracticability of beginning operation at high speed. Over six months elapsed before the scheduled speed could be attained, in spite of efforts at prohibitive cost to bring it about. It is natural to conclude that the most important factor in seasoning the track was not the labor which was expended, but rather the pounding of the trains over a period of time.

Marble Hill Cut-Off.—This project is an illustration of track which was ostensibly constructed for a speed of 60 miles an hour. Here again we have one of the few examples of tracks intended for high speed, but which in spite of every effort could not be brought to scheduled speed until they had been subjected to the pounding of trains and action of the elements for a period of nine months. The two middle tracks were placed in service on February 6, 1906, with a speed restriction of 20 miles per hour and the maximum permissible speed was not permitted until November 1, 1906. The two remaining tracks were placed in service on October 1, 1906. This instance can hardly be pointed to as supporting the contention of the Interveners that it is practical to open tracks for high initial speed.

Nepperhan to Ardsley.—This track was reported as having been built for a maximum permissible speed for passenger trains of 45 miles an hour. The record shows, however, that the track was put into service on December 13, 1912, at a speed of only 15 miles per hour, increased on January 4, 1913, to 35 miles per hour and on January 30 to the maximum permissible speed of 45 miles per hour. This short piece of second track, 3.61 miles in length, furnishes no proof that an entire railroad system can be reproduced to carry traffic at high speeds at the commencement of operation.

Newfield to Atlantic City.—The witness presenting this project could not furnish any definite information as to when the first operation began. The track was completed in June but was not turned over to the Operating Department until October, 1906. No information was given as to the use made of the track between June and October.

Carlisle to Greason.—Like other Pennsylvania projects no definite information could be obtained with reference to the speed of initial operation over the newly constructed lines. This short line revision job was placed in operation in small sections at various times between November 1, 1910 and March 13, 1912, a period of one and one-half years. The general orders placing the various sections in operation all required reduced speed. The date when the 70-mile speed was effective is not shown, but it is certain that it was not placed in initial operation at any such speed.

Duncannon to Aqueduct.—Similarly on this job operation began at a reduced speed and not until the track had compacted under traffic could the maximum permissible speed be permitted. The line went into operation at various dates and while the maximum permissible speed at the time of closing the construction accounts is stated as 70 miles an hour, a reference to the general orders placing the track in operation discloses that they all required reduced speed until the track was settled. Examination of the record fails to show when the speed restrictions were removed and the maximum permissible speed of 70 miles permitted.

Granville Bridge to Mayes Bridge.—The maximum permissible speed of 70 miles was not the actual speed of the first regular operation. The orders placing the track in operation required that speed be reduced until the track had settled. These speed restrictions were apparently removed in May, 1906, although some of the track had been operated *several months* prior thereto. This work is the revision of a four-track main line where it was absolutely necessary to make the track capable of high speed at the earliest possible moment; yet it appears that nearly five months were required before speed restrictions could be removed.

Indiana Harbor to Millers.—Inasmuch as this construction was an integral part of a high-speed line, every effort was made to get it into high-speed operation at the earliest possible moment. An attempt was made to hasten the time when high speed

could be permitted by running work trains back and forth over the tracks. Operation began on July 14, 1908, for part of the line and August 27, 1908, for the remainder. In spite of every effort, however, the 60-mile speed was not made effective until October 11, 1908. (Tr. p. 4895.) This experience indicates that for all practical purposes this normal process of seasoning must be gone through before the track is safe for high-speed operation.

Uniondale to Simpson.—This project is reported as having been constructed and opened for a speed of 60 miles an hour. The witness had no definite information, however, as to the initial speed permitted, but was told by the superintendent that it was probably 15 to 20 miles per hour. (Tr. p. 2427.) Operation began at this speed some time in 1913 and the 60-mile maximum permissible speed was apparently not allowed until the end of 1914.

New York Short Line.—This track is an integral part of the Reading Railroad between New York and Philadelphia where it was essential that the new tracks be operated at high speed as early as possible. No witness was presented who was personally familiar with this construction. The main line was alleged to have been constructed for a maximum speed of 75 miles per hour and the weighted average speed is shown in the summaries as 73.16 miles per hour. Information as to speed, however, was gained from operating time tables which show that the maximum permissible speed is

75 miles per hour for the through line of the Reading between New York and Philadelphia. (Tr. p. 2439.) The witness had no bulletins or orders governing the speed of this particular track at the opening date. He did find one order requiring reduced speed over a high bridge. (Tr. p. 2526.) The printed time-table for the whole line can not be considered as proving conclusively that high speed was allowed on this small section of track and is not necessarily the speed at which passenger trains actually ran. The compacting of this stretch was artificially hastened by the operation of freight train for a period of nine days.

Costs are included after the beginning of operation

The Interveners in brief (Br. p. 34) contend that there are no costs for solidification, seasoning or appreciation included in their cost data. The records show that this statement is not in accord with the facts. In spite of the fact that on most of these "high-speed" tracks, a considerable period elapsed between the beginning of regular operation and the date at which scheduled speed was permitted, charges, both construction and maintenance, are included on many jobs up to the date on which the maximum speed was first permitted. These changes after the beginning of operation run into large sums of money. As pointed out elsewhere in this brief, it is not proper under the Classification of Accounts to charge to the construction account

maintenance expenses occasioned by the operation of revenue traffic. In this respect, therefore, the costs of these high-speed tracks include a large amount of charges which involve incorrect accounting and for that reason also the results derived therefrom must be questioned.

The Interveners attempt to justify the inclusion of costs up to the time the tracks finally attain the maximum speed as being proper construction costs on the theory that the construction accounts should not close until the permissible speed has been reached. This theory would result in charging to the construction account all expenditures for resurfacing, relining, and curing defects due to operation. The Interveners were compelled to take this position as they were unable to secure projects opened at high speed initially and free from such criticism, upon which to base their pricing schedule. If their contention were correct, the construction accounts would be closed only at the whim or pleasure of the particular official in charge of the project.

In no instance did the Interveners show that a particular speed was specified in the authority for expenditures on any of the projects. It is not practicable to determine upon a preconceived speed to be attained after a definite period of operation. Frequently conditions are such that due to the character of the soil or to heavy fills, the carrier is not able to prevent the sinking of the roadbed or other

defects for many years. On some of the older roads there are soft spots which are still unstable after a period of operation of 30 years. Under the theory advanced by the Interveners, it would be necessary to keep the construction accounts open and include therein all costs for maintenance until such conditions have been cured.

The inevitable conclusion is that a pricing schedule based on such data is worthless

We have seen that the pricing schedule for the higher speed tracks is defective and must be discarded for four outstanding reasons: (1) there are used only 10 projects comprising less than 100 miles of line which is not sufficient to be representative of average conditions upon which to base a pricing schedule; (2) the character of the work involved in these 10 "high speed" projects is of a nature that is bound to be extremely expensive and would never be incurred in a theoretical reproduction; (3) the projects which purport to have been opened at high initial speeds were in fact operated for a time at low speeds, which were gradually increased as the roadbed solidified under the action of trains and the elements; and (4) maintenance charges are included in the costs. The same defects exist in the pricing schedule as a whole.

(2) THE PRICING SCHEDULE IS ERRONEOUSLY CONCEIVED AND DEVISED

We have already emphasized that this entire presentation is an attempt to estimate the cost of

seasoning and we think entirely unsound in principle. The schedule has been developed, however, and there are certain serious defects which should be pointed out.

Many projects were omitted in developing the pricing schedule

All of the 48 projects in the Southern Group and 26 of those in the Eastern Group were omitted in developing the pricing schedule. No reason was assigned at the hearing for the omission of the Southern Group projects as an entirety. In brief, however, the Interveners state that the Southern Group projects were not summarized because they were not sufficiently homogeneous and representative. (Br. p. 64.) If the oft-heralded desire of the Interveners to present all available information to the Commission were consummated, it would seem that the conclusions to be drawn from these Southern Group jobs should be offered for whatever they are worth. Apparently the pricing schedule is not suggested for application in Southern territory for the reason that the Interveners have now taken the position that there should be a geographical division of cost data, although this is inconsistent with their former position. (Tr. p. 493.)

There is no testimony to indicate that the cost data of the Southern Group are not as representative of tracklaying generally, as those of the Eastern Group. The costs reported in the Southern Group data are lower than in the Eastern Group.

If the southern projects were included in the summaries, excluding certain of the Louisville and Nashville jobs which under any circumstances could not be considered as reliable cost data, it is probable that the results obtained in the pricing schedule would be materially changed. No doubt there are other reasons which actuated the Interveners in excluding the Southern Group projects. As the Southern Group does not favor Formula F (Tr. p. 6281) one obvious answer might be that it does not now agree with *this* schedule. Another reason might be that a pricing schedule for higher speed tracks could not be devised from Southern Group data as only one project in that section was reported as having been constructed for a higher speed than 30 miles.

Twenty-six projects in the Eastern Group were also omitted. Mr. O'Brien who presented the summaries and the pricing schedule made these omissions under the direction of counsel and, in some instances, was unable to explain the reasons therefor as is evidenced by the following:

Q. Did he tell you he wanted to leave them out?

A. Yes, sir.

Q. Did he tell you why?

A. *I do not know. He may have said he did not like them, or something like that.* (Tr. p. 6128.)

Counsel for the Interveners, therefore, is the sole author of the selections upon which the conclusions

have been based, and, in a number of cases, there is still no explanation of his choices beyond the fact that he did not "like" them.

The reasons which justify the omission of these projects require the exclusion of others

The various omissions and inclusions directed by counsel for the Interveners require more than passing attention. Some of the projects were omitted for the reason that they were built subsequent to the pricing period. (Tr. p. 6135.) We agree that this is a valid reason for excluding them and it should also be applied to a number of projects where a distinct portion of work was completed as late as 1916 or 1917, as, for example, the projects included in exhibits 241 and 245. The Cambria spur, a New York Central project (Ex. 226) was omitted because it was "ballasted in winter." The ballasting price was unusually high due to the fact that it was necessary to handle frozen ballast, the average cost per cubic yard for placing ballast being 60 cents. (Br. p. 53.) It is not unique in that respect. Numerous other jobs were also ballasted in winter, and if this reason is sufficient to exclude one project as not useful, it should apply to others as well. For example, the Marble Hill Cut-Off, another New York Central project (Ex. 236) was apparently constructed, in part at least, during the winter season with an average cost for placing ballast of 61 cents. Another example which might be cited is the Rockdale to Rockdale Junction proj-

ect on the E. J. & E. (Ex. 273) on which the ballasting was done during the winter season. The exhibit, itself, shows on its face that there were serious delays caused by weather conditions with a corresponding effect on the construction costs. On the Danville Extension of the New York Central (Ex. 360) work was rushed to completion during the winter. This is the largest project used by the Interveners, 157 miles in length, and consequently exerts considerable influence upon the weighted average of the results shown in the pricing schedule. Consistency would require the exclusion of these projects.

The Lake Mahopac Branch, a New York Central project, (Ex. 235), only 1.26 miles in length, was omitted for the reason that it had "very short mileage." (Tr. p. 6135.) Elyria Junction to Amherst, side tracks (Ex. 357-S) with a mileage of only 0.992 mile is included in the summary and used to develop the pricing schedule as a separate project. Counsel has not indicated just where he draws the line between projects of "very short mileage" which are improper to use as cost data and lines of "very short mileage," which may be properly included. There are a number of other jobs also of very short mileage, not quite so small perhaps as the project excluded, but yet deserving of the characterization "very short." For instance, the North Fork Branch of the B. & O. (Ex. 236) comprises only 2.226 miles and the Marble Hill Cut-Off of the New York Central (Ex. 236), only 2.92

miles. There are included at least a half dozen jobs in the neighborhood of 3 miles in length. The basis of the distinction between a project one mile long and two miles long as good cost data is not shown. The Interveners' witness Kittredge was of the opinion that projects even as small as one-quarter of a mile might be useful. Counsel apparently did not agree with his one expert witness and eliminated one project even though it exceeds this one-quarter of a mile limitation. It is hardly logical for counsel to urge upon the Commission the views of his own expert when he, himself, refuses to adopt them in the schedule which he presents.

The Barnesville to Dickerson project of the B. & O. (Ex. 285) was omitted because it "includes too much throwing track." (Tr. p. 6135.) Throwing track is objectionable as cost data because it involves work under operation and would not be encountered in reproduction. The rejection of this project for that reason would seem to constitute an admission by counsel that such work is more expensive than would be encountered in reproduction as has always been contended by the Bureau. There are several other projects used to develop the pricing schedule where considerable work in throwing track was involved. These projects, of course, result in higher costs and have an important influence upon the pricing schedule. The fundamental objection to the inclusion of a project involving work of this nature is, as stated, that the work was done under operation and this same ob-

jection applies to many of the projects used in developing the pricing schedule, such as additional tracks or line changes.

The projects on the Pittsburgh and Shawmut (Ex. 311 to 319, inc.) were omitted because witness Morrison could not show satisfactorily that the distribution of costs between Account 12 and other accounts was proper. (Tr. p. 6136.) These jobs were not unique in this respect. On many projects, it was developed that the distribution of charges as between the various accounts was no more satisfactory than the ones which were excluded.

The four Wabash projects were also omitted. Definite information as to why these were omitted could not be obtained at the hearing, but we are advised in brief that the costs were developed only to show that the contracts did not cover the complete costs. Counsel fails to mention, however, the reason for omitting these projects from those used to develop the pricing schedule. The reasons which justify the exclusion of the various projects mentioned would require the exclusion of many of the cost studies used in the summaries.

The Interveners in developing their pricing schedule have erroneously assumed that the Bureau prices do not include maintenance during construction

With only the 74 remaining projects, most of which are not representative of reproduction conditions, and without correcting any of the erroneous

costs, the Interveners made certain summaries. The ultimate object of these summaries is to develop a separate price to cover what they denominate the cost per mile of surfacing, lining, and maintenance during construction, and which we refer to as intensive surfacing. Certain assumptions are indulged in and several steps gone through before this amount can be separated. They assume that the total reported costs represent four separate items: Tracklaying with a running surface, installing accessories, placing ballast, and the intensive surfacing, including maintenance during construction after ballasting. They then assume that the engineering report contains only the cost of tracklaying with running surface, installing accessories, and placing ballast, and these three items they deduct from the reported costs. The amount remaining is intended to represent the cost of bringing an unseasoned track to a condition in which it is capable of sustaining the speed permissible on valuation date.

Before pointing out the fallacious methods adopted, we must first correct the erroneous assumption that the costs in the engineering report represent only the three items of tracklaying with running surface, installing accessories and placing ballast. The Interveners in brief state that the comparison between the reported costs of laying skeleton track with light running surface and the Bureau's prices for tracklaying and surfacing indi-

cates "that the Bureau's allowance per mile for laying skeleton track and such surfacing as is performed before the ballast is placed, were as near correct as possible, and that the difference between the Bureau's allowances and the carriers' claims was not in the price allowed for laying and surfacing skeleton track." (Br. p. 66.) If it were true that the Bureau's prices check with these erroneous cost data, this fact alone would be sufficient to warrant a sweeping reduction in Bureau prices, and would seem to justify the criticism that the Bureau has erred on the side of liberality. The Interveners' concession, however, is clearly based on an erroneous understanding of what the Bureau's prices for tracklaying and surfacing comprehend. The Bureau's prices include whatever maintenance during construction and surfacing is necessary before the tracks would normally be placed in operation (Tr. p. 6426) in an amount not to exceed \$200 (Tr. p. 6552). This includes whatever maintenance work is required to maintain the skeleton track for the operation of work trains and whatever maintenance is necessary after ballast is placed, prior to commercial operation. (Tr. p. 6554.)

It is, therefore, apparent that some of the work for which provision is made in the Interveners' pricing schedule, that is, the maintenance during construction, has wholly been taken care of in the Bureau's per mile prices for tracklaying and surfacing. This misunderstanding as to what the Bureau's prices are intended to cover destroys any

value the Interveners' computation might have inasmuch as they assume that the amount which they deduct covers fewer items than is actually the case.

The confusion with respect to this matter apparently arises from counsel's misunderstanding of the phraseology used by Mr. Saunders in the Vandalia Case. In brief, counsel persists in erroneous conclusions drawn from that testimony, although the Bureau's position was made very clear in the present case. Counsel developed the facts by his own questions:

Q. (By Mr. Ives.) Well, I think there is a plain inference from the questions and answers which I read, Mr. Saunders, that if there is any maintenance during construction in your total figure, it is in the per cubic yard price.

A. Well, I think that is entirely erroneous.

Q. That is erroneous. Whatever maintenance during construction there is, is in the per mile price?

A. Yes, sir.

Q. So that the per mile price includes the tracklaying and surfacing cost up to the time of placing the ballast, plus such maintenance during construction as occurs after the placing of ballast?

A. Yes, sir; and whatever expense of any nature relating to tracklaying itself. (Tr. p. 6553-54.)

The fact is, therefore, that the Bureau's per mile prices for tracklaying and surfacing include whatever maintenance during construction is necessary before the beginning of commercial operation but not the intensive surfacing here sought by the Interveners.

The Interveners' method of making deductions is faulty

In order to understand the derivation of the pricing schedule, it is necessary to review the methods by which it was reached. Prior to making the pricing schedule the Interveners attempted to separate from the total reported costs, the cost of the intensive surfacing upon which the pricing schedule is based. Consequently it was necessary to deduct the costs of installing specialties, tracklaying with a running surface and placing ballast from the total costs.

On projects where there was a separation of costs the Interveners deducted from the total reported cost the cost of placing the various track specialties, such as framing and placing bridge ties, placing turnouts, tie plates, etc. While these specialties are included in the Account 12 costs, they receive a unit price in the engineering report, rather than a price per mile. On the majority of the projects it was not possible to determine accurately the actual cost of installing these items. Inasmuch as it was believed that the carriers were in substantial agree-

ment with the amount adopted in the engineering reports for these items (Br. p. 66) deductions were made in these cases on the basis of either memorandum 733 or engineering report prices. This method fails utterly to recognize the fact that in the actual construction of these projects many of these specialties such as turnouts, etc., were installed *under operating conditions*, where the actual cost is of necessity infinitely greater than the theoretical price adopted by the Bureau as the cost of placing such specialties under reproduction conditions. Thus it becomes obvious that these deductions on the basis of Bureau prices are in most cases far from sufficient. The theoretical price is intended to reflect normal construction conditions, whereas the actual work was done, in many instances, under most abnormal and adverse conditions. In one or two cases the adjustments were made by the carriers themselves rather than by the Interveners' employees, and in these cases the computation is no less faulty. On certain Pennsylvania projects, later to be discussed, where the actual contract price for placing turnouts was known, a deduction was made on the basis of Bureau prices which was only 40 per cent of the actual contract cost. There is no excuse to resort to estimates in a case where the actual cost is shown.

On 21 jobs no separation of the costs of tracklaying and surfacing from the total costs was possible. The engineering report price for tracklaying and

surfacing was assumed by the Interveners' counsel to represent only the cost of laying skeleton track with running surface, and on these 21 jobs was deducted from the amount remaining after the adjustment for the cost of placing specialties. This method is subject to the criticisms that the theoretical price does not reflect the actual difficulties of the work, and that the tracklaying and surfacing price and the skeleton track items in the reported costs do not contain the same elements.

The amount remaining after deducting the cost of laying skeleton track and placing specialties is assumed to represent the cost of placing ballast *and* the cost of surfacing, lining and maintenance during construction. Some way had to be devised to separate the cost of inserting the ballast from the other items. Again we find that use is made of the bureau prices in that the deduction for placing ballast has been made on the basis of an average of memorandum 733 maximum prices.

The brief of the Interveners and the summaries presented by them leave the distinct impression that they approve the maximum prices used in Memorandum 733 for placing ballast, at least as far as their purposes in this case are concerned. One cannot but wonder at their disposition to agree with Bureau prices when such agreement serves their advantage. They have no proof that the actual cost of placing ballast on these jobs approximates the maximum price stated in Memorandum 733 for this item. If in fact the actual cost was

greater than the maximum Memorandum 733 prices, amount remaining after the deduction would inevitably be considered smaller and they would have a lesser amount on which to base a schedule of prices for intensive surfacing. When it is considered that Memorandum 733 prices were formulated as applicable to reproduction quantities and that the carriers' costs of placing ballast are based on much smaller quantities inserted in many cases in patch work fashion under operation, there is no other assumption possible than that the actual costs of this item as reported in the projects presented are in excess of the memorandum prices, both by reason of the fact that improper charges are included in the data and that the manner in which the work was performed is more expensive than would be the case in reproduction.

The amount remaining after the three deductions mentioned above is stated to represent the cost of maintenance during construction, surfacing, and lining, and has been set up on a per mile basis, the amounts varying from \$65 for a track capable of a speed of ten miles per hour, to \$1,120 per mile for a track capable of a speed of 70 miles per hour. *What this remainder really represents, however, is the total accumulated difference between the carriers' faulty reported costs and the excess costs due to the character of the construction plus the cost of intensive surfacing and seasoning on the one hand, and prices adopted by the Bureau in memorandum 733 or in engineering report on the other. If cor-*

rections were made in the reported costs to eliminate items of expense which are not properly chargeable to Account 12, and items of expense which, although properly incurred in actual construction, would not be contemplated in reproducing new the same stretch of track under reproduction conditions, the result would undoubtedly more nearly support the prices used by the Bureau rather than the pricing schedule presented by the Interveners.

Fallacy of applying theoretical unit prices to total reported costs

The practice referred to above of adjusting total reported costs by the application of theoretical costs is basically unsound in principle, and its fallacy is accentuated when the reported costs are inaccurate in themselves, and cover projects where conditions are entirely different from those assumed for the theoretical price. It requires no argument to make it plain that if deductions are to be made, an amount proportionate to the actual cost of the specific item should be deducted rather than a theoretical amount having no relation to actual cost. Because of the very nature of the two types of cost; one theoretical, contemplating most efficient and economical conditions, the other involved with many considerations other than economy of construction, such as operating necessities, etc., it is obvious that total costs made on the second basis

can not be adjusted by the application of unit costs made up on the first basis. The Bureau's prices admittedly contemplate favorable conditions and the most economical methods, neither of which were present in the carriers' projects in a very great degree. Naturally, the Bureau's unit prices are likely to be lower than the carriers' unit prices developed from the unrepresentative type of data here presented. As a result, deductions on the basis of Bureau prices are very likely to leave the remaining amounts inflated. Since it is upon such inflated amounts arrived at in this manner that the Interveners' pricing schedule is built up, too great emphasis can not be laid upon the fallacy of the method used, and the misleading character of the results.

Erroneous methods used in plotting the pricing curve

The pricing schedule is founded on the difference between the two lines plotted in Exhibit 400, translated into dollars per mile for the various speeds indicated, the difference between these lines being supposed to represent the cost of lining, surfacing, and maintenance during construction. The object of the diagram is to break down the costs remaining after the deduction of skeleton track costs and the cost of placing specialties. Cost of ballasting is shown as a straight line, being based on the average of Memorandum 733, maximum prices for placing ballast, or 26.3 cents per cubic yard. The distance between this lower line, representing ballasting and

the upper line, representing ballasting plus "intensive surfacing" increases as the other ordinate, the speed in miles per hour increases. Only three points were used in plotting the upper line. These points are the weighted average costs for three groups of weighted average speeds between 0-25 miles, 25-50 miles, and 50-75 miles an hour. Just why this line should be plotted from only three points arrived at in this manner is not explained. Mr. O'Brien was instructed to do the work in this manner. He could not say why the upper line should not be plotted on a basis of 5 mile speeds since it was desired to show the formula by five mile speeds. (Tr. p. 6268.) Is it unreasonable to surmise that these three points were developed in order that the upper line might approximate a straight line in accordance with the opinion previously held by the Interveners and given expression in Formula F, that the cost of intensive surfacing varies *in direct ratio* with the speed in miles per hour? The pricing schedule as finally presented was drawn directly from the graph in Exhibit 400 by scaling the amounts shown for each 5 mile speed; that is, the difference in cents per cubic yard at any speed was multiplied by the average number of cubic yards of ballast per mile.

Sound engineering practice has indicated that the greater the number of the points used to build a curve, the more accurate the conclusion is apt to be. The Commission undoubtedly would be interested to know what the upper line in Exhibit 400 would

show if it were plotted on the same 5-mile basis as was used for the pricing schedule. The Bureau has done this, taking the Interveners' own figures from Exhibit 400, and the result is incorporated in this brief as Appendix III. The additional line, plotted in this manner, shows conclusively that the theory of the Interveners is not sustained by their own data and that *there is no constant and direct ratio between the alleged cost of intensive surfacing and the speed in miles per hour*. Exhibit 400 thus plotted on a five-mile-per-hour interval shows that the cost of ballasting, lining, and surfacing does not increase uniformly if these erroneous costs can be relied upon to prove anything. For instance, the cost between 20 and 25 miles per hour is less than that between 15 and 20 miles per hour. Between 35 and 40 miles per hour, the cost is less than between 30 and 35. Likewise the cost between 55 and 70 miles per hour is less than that between 40 and 55. There are only two jobs between 40 and 45 miles per hour, one job between 45 and 50 miles and one job between 50 and 55, where the costs average highest. The curve above 60 miles per hour is plotted by using *only three jobs*. It goes without saying that there should be a sufficient number of jobs used at each five-mile interval so that the resulting point may be representative of average conditions for that type of work. One single job may have some particular feature of cost which is above or below the average and the use of only one job is likely to produce a distorted result.

Exhibit 401, the pricing curve, has been plotted by the Interveners on a five-mile speed interval. This curve has been developed from the upper curve shown in Exhibit 400 which was plotted on 25-mile intervals. This pricing curve as it would look had it been developed throughout on a five-mile interval is reproduced herein as Appendix IV and shows even more strikingly that there is *no constant and direct relation between the cost of surfacing and the speed of track*.

Conclusions.—The above discussion leads to the conclusions: (1) that no reliance can be placed in the results of the summaries because of the erroneous methods used in their computation, even assuming that the underlying data were accurate, and (2) that the method used in plotting the results gives an incorrect curve, the data in reality showing that there is no uniform ratio between the speed and the cost of intensive surfacing.

(3) OTHER REASONS JUSTIFY THE REJECTION OF THE METHOD ADVOCATED

We believe that we have conclusively shown that neither the pricing schedule nor the cost data can be used in estimating the cost of reproduction new. There are several other reasons which justify the rejection of the method advocated. But before discussing them, attention should be especially directed to the changed position of the Interveners with respect to the effect of labor rates on the costs of tracklaying and surfacing.

The Interveners' new attitude in the treatment of the labor rates reacts to their advantage

The labor rates in effect during construction were shown on all exhibits. These labor rates were arrived at in different ways and represent in many instances nothing more than a guess on the part of the compiler. The Presidents' Conference Committee has heretofore contended that the total cost of a project should be adjusted up or down to a 15 cents per hour basis in direct ratio to the rate paid common labor, and this was done on all exhibits. (See Quest. 1 of Exhibits.) The theory apparently was that the Bureau's prices were based upon an average labor rate of 15 cents prevailing during the pricing period. The Bureau contended, as it has all along, that the costs of tracklaying and surfacing do not vary in direct proportion to the labor rates.

In brief, however, the Interveners abandon their long-advocated contention that the total reported costs should be adjusted to a 15-cent basis, in this language, "Hence in an effort to meet the Bureau, when possible, it was decided that in the summaries no correction should be made for labor rate." (Br. p. 65.) The ready acceptance of the Bureau's contention in this regard, of course, aroused our curiosity. A better explanation of their ready agreement can be found in Exhibit 402 where the weighted average labor rate for the projects used is shown as 15.61 cents per hour for

74 jobs in eastern territory. An adjustment in accordance with their former contention would require a *reduction* of the total costs in direct proportion to the labor rates. While this would require a reduction in the total costs of only 4 per cent, yet as the greater part of the deductions from the total cost were made at Bureau prices and would, therefore, remain unchanged, the major part of the reduction would fall upon the excess and consequently upon the pricing schedule and would approximate *18 or 19 per cent*. This would have caused an average reduction in the schedule ranging from about \$10 per mile for the 10-mile track to about \$220 per mile for the 70-mile track.

The use of the speed factor does not give reliable results

It has already been pointed out that the pricing schedule is completely bound up with the permissible speed of the tracks. If, therefore, the results are to be given any weight, it is necessary that the information as to the speed on the various cost data projects be complete and reliable. The exact opposite of this is true, however. On a great many projects the accuracy of the statement regarding the permissible speed at the close of construction accounts is open to question. The witnesses who presented the various exhibits in most cases were not familiar with the actual construction and could not give personal information as to the actual speeds permitted. They were forced to rely upon what

records were available and these, in many cases, were meager indeed. Frequently no information as to the speed at construction date was obtainable other than the printed time-table for the whole division which, of course, may not have applied specifically to the new track. In not a few cases the superintendents were called upon to furnish from memory an estimate of the permissible speed at the opening date.

The inaccuracy of the speed statements as set out in the exhibits was illustrated in several cases where the Bureau called upon the carrier to produce its records in the shape of train orders and bulletins. In many cases these show that the track had been opened at a much slower speed than that indicated upon the exhibit. For example, on the Crane's Village Change of Line on the New York Central (Ex. 228) a speed of 50 miles per hour for passenger tracks is shown in the exhibit. Inspection of the carrier's files, however, shows that the initial speed was only 25 miles, which was subsequently increased to 35 miles per hour and later to 50 miles per hour. If the carriers had reported their so-called high-speed tracks at the actual speed of initial operation there would be practically no projects to support the pricing schedule for the higher speeds.

Aside from the fact that speed has no proper function in determining the cost of tracklaying and surfacing, it should be pointed out that a formula based on speed is objectionable from the standpoint

of its application to existing railroads. The matter of the maximum permissible speed is left to the judgment of the operating officials and would depend a great deal upon the operating officials' opinion. Two perfectly competent engineers might disagree as to the proper speed. Thus the present proposal of the Interveners would practically put into the hands of one official or set of officials the determination of the reproduction estimate for tracklaying and surfacing.

Comparison of costs with engineering report prices improperly made

In the individual exhibits and in the summaries, comparisons have been made between the reported costs for the projects and amounts derived by applying to the unit quantities in place the engineering report prices applied on the valuation section of which the project is only a part. This method does not give a true comparison between the carriers' costs and the Bureau prices. The engineering report unit prices have been developed and applied to the whole valuation section, generally much greater in mileage than the project reported. The unit prices, therefore, are not intended to reflect conditions on the particular part of the valuation section covered by the cost data project. If the construction project had constituted an entire valuation section, there is no assurance that the comparison with the unit prices

adopted in the engineering report might not be entirely different.

Conversely, if another view is taken of the situation, it is improper to project the reported costs of a portion of a valuation section over that whole section and then compare the unit costs with those applied in the engineering report, for the manifest reason that if the cost data project had been equal in size to the valuation section, it is entirely probable that there would be no direct ratio between the total costs for a part of the section and the cost for the whole section.

Determination of tracklaying and surfacing prices by the application of a rigid formula is not proper

The Interveners' pricing schedule as developed applies the same amounts for intensive surfacing at particular speeds without any reference to other conditions than speed which may affect the alleged costs of this item. We do not believe the Interveners would take the position (assuming for the moment the correctness of their own theory of reproducing the tracks in a seasoned condition) that this item would cost the same for, say, a 60-mile track regardless of the condition of soil and climate. No provision is made in their formula for any difference between the cost of intensive surfacing for high-speed tracks which are built on high unstable fills or through swampy country, and the cost for those built in a location where the subsoil is firm and stable.

In contradistinction to the rigidity of the formula method, there should be pointed out the flexibility of the judgment method of pricing employed by the Bureau. Full information is available to the Bureau with regard to the physical features which may affect the cost of tracklaying, and the Bureau's method permits consideration to be given to these variable factors.

The Interveners have changed their attitude in confining their cost studies to eastern territory

We have dealt with the unrepresentative character of the construction projects upon which the present pricing schedule is based. Although little new construction of consequence has occurred in the East since 1900, there was considerable in western territory during the pricing period. In proceedings heretofore, the Eastern Group has used western projects to check Formula F. Indeed, Mr. Hale, Engineer of the Eastern Group, testified at a 1923 hearing in this same case when supporting Formula F, that geographical location made practically no difference in costs of tracklaying and surfacing. He said:

I have been in the business of building track for the majority of my railroad experience and there is nothing so far as I know that makes a difference in the cost of tracklaying and surfacing due to geographical location. My tracklaying and surfacing experience has extended from

the Atlantic Coast to Pueblo, Colorado, and from Nebraska to the Gulf of Mexico, and in that territory, so far as I know, there is nothing that affects the cost of tracklaying and surfacing which is due to geographical location. (Tr. p. 493.)

The cost data used to develop the present pricing schedule has been confined to the territorial limits of the Eastern Group. The Interveners have not tested the results derived from their cost data by a comparison with the costs of doing work which is in some measure comparable to reproduction.

The cost data, when tested by new construction, produce excessively high results

The costs of 9,910 miles of new construction on 147 projects in western territory were presented by the western carriers in Exhibit 76 in the Duluth, Missabe and Northern case. While the Bureau does not agree that these costs were correct and accurate in every particular, yet in order to show the results obtained by applying Formula F to any amount of new construction of consequence, the Bureau applied it to the Western Group data, without making any modification in the costs, and arrived at a most surprising result.

It was found that the formula produced an amount which in the aggregate is 29 per cent higher than the total costs reported by the western carriers, including the estimated costs for transportation of men, outfits, and supplies. Most of the

work in western territory is far distant from labor markets and sources of supplies, and the transportation items, of course, form a substantial proportion of the total costs. Eliminating these estimates for transportation, which in the thickly settled eastern section, does not reach a material amount, we find that Formula F produces a result *40.4 per cent higher* than the reported costs. Furthermore, the application of the formula gives results varying as widely as 220 per cent from the reported costs of individual projects.

The Interveners state in brief (Br. p. 76) that Formula F gives results which are not far from correct and that in a general way it agrees fairly well with their cost data. We must conclude, therefore, that in the light of the results obtained by applying Formula F to representative construction work, the cost data produce excessive results.

III

THE BUREAU'S PRICES ARE SUFFICIENT TO PRODUCE A NEW TRACK OF THE TYPE IN EXISTENCE ON VALUATION DATE

At the outset it should be made plain what is included in the Bureau's unit prices for Account 12, Tracklaying and Surfacing. As there is comparatively little earth-surfaced track in eastern territory, the discussion will be confined to ballasted tracks. The per mile price for tracklaying and surfacing covers all costs of distributing and assembling the track materials into a completed

track, including work-train service, rent of equipment, etc. It also includes the cost of a running surface and the maintenance during construction before the placing of ballast as well as such maintenance as may be necessary after ballasting and prior to the time that the road is placed in commercial operation. A separate unit price is applied for the estimated cost of placing ballast and for installing specialties such as turnouts, tie plates, etc.

The Bureau at the beginning of its valuation work made a widespread investigation to determine the cost of tracklaying and surfacing. After many conferences with representatives of the carriers, the Engineering Board, composed of five experienced engineers, adopted a schedule of prices for tracklaying and surfacing which was approved by Director Prouty in Memorandum 733 to the Engineering Board. Even after the promulgation of the schedule the Engineering Board continued its study of available costs and held further conferences with carrier representatives and at a subsequent time reaffirmed this schedule. As this memorandum is well known to the Commission, it will be sufficient here merely to say that the prices for tracklaying and surfacing range from \$825 to \$1,000 per mile for varying weights of rail.

This schedule of prices was not issued as a price scale to be applied rigidly, as it was specifically provided that the engineers might in their judgment

exceed the maximum or go below the minimum in its application to particular carriers. In practice it has been used as a guide, and the prices applied in many instances are in excess of the maxima, showing that such judgment has been exercised, and that in the determination of prices the type of the track and other pertinent facts have been considered. The record is replete with examples of the exercise of judgment by the Engineers in the application of Memorandum 733. We find that for tracks laid with 100-pound rail or over the maximum of \$1,000 per mile for tracklaying and surfacing is generally exceeded. In two instances the engineering report prices exceed the maximum by \$400.

We have heretofore adverted to the fact that the Interveners presented no evidence to show the cost of reproduction new of a track in the new condition assumed by the Bureau. Their evidence was directed toward a determination of the proper price to be applied to the reproduction of a seasoned track. For the reason, therefore, that the Bureau's prices under its theory of reproduction have not been directly challenged by a presentation of evidence on the part of the Interveners, we shall not enter into a detailed discussion of the evidence in support of its prices further than to point out its general nature and the conclusions to be drawn therefrom.

Carriers' cost data indicate that the engineering report prices are not only sufficient but liberal

The Interveners agree that the prices applied for installing specialties are sufficient. They assert that the maximum Memorandum 733 prices for placing ballast should be uniformly applied, but the only basis they have for this contention is their desire to see such a price used. The question of the proper prices for ballasting will be discussed subsequently.

The Interveners concede that the prices actually applied in the engineering reports for tracklaying and surfacing are sufficient to cover the elements which they conceive that the Bureau intended to include under that heading. In other words, they agree that the engineering report prices for tracklaying and surfacing are sufficient to cover all work in connection with tracklaying and surfacing, including work-train service, etc., and maintenance during construction up to the time of ballasting. Apparently their only source of disagreement with respect to the engineering report prices on the Bureau's theory is their belief that they do not cover maintenance during construction after ballasting. In this belief we have already shown that they are mistaken.

Their agreement on this score is based on the close comparison of the engineering report prices with average reported costs of skeleton tracklaying on 53 Eastern Group projects where the costs were

separated. The reported cost for skeleton track for the 53 projects is \$1,613,813; the total amount produced by applying Formula F to these projects at the reported labor rate is \$1,336,364; the engineering report prices for the same jobs total \$1,590,677 as compared with maximum Memorandum 733 prices of \$1,542,635. It should be observed that, first, the prices actually applied in the engineering reports are considerably in excess of the maximum Memorandum 733 prices; second, that the engineering report prices are substantially the same as the prices for tracklaying, initial surfacing, and all work up to the time of ballasting as reported by the carriers for these small line revisions, additional tracks, etc., including erroneous charges; and third, that the engineering report prices exceed Formula F figures by more than 15 per cent. Formula F figures and the reported costs do not include any maintenance during construction after the placing of ballast whereas the Bureau's figures include such work. One of two conclusions may be drawn from the closeness of the comparison of the engineering report figures with these erroneous costs for expensive types of construction; first, that the engineering report prices are sufficient to include some additional element not included in the reported cost or in Formula F, that is, the necessary maintenance during construction after the placing of ballast until the tracks are placed in operation; or second, that if the engineering report prices do not include

any such maintenance, the Bureau prices are far too liberal. The first conclusion is the proper one, that the Bureau prices include maintenance during construction subsequent to the ballasting.

We have already mentioned that the engineering report prices applied to the 53 projects slightly exceed the maximum Memorandum 733 prices and that the Interveners concede that the engineering report prices are in line with the average reported costs. They contend in brief, however, that the maximum Memorandum 733 prices are insufficient apparently because they are lower than the engineering report prices, which check with their average reported costs. In this connection it should be observed that 21 of the 53 projects have rail 100 pounds and over, and are of the highest type of construction. The fact that such a large proportion of these 53 jobs is of a high type of construction may be taken as conclusive evidence that the whole collection of jobs can not be considered as representative of average construction. These are cases of the kind where Memorandum 733 permits the engineers to go above the maximum prices, if in their opinion it is justified; and the fact that the limits of the Memorandum are exceeded in these special cases indicates that this judgment has been wisely exercised. Naturally, the fact that so large a proportion of the whole is of a high type of construction, where the maximum prices may rightly be exceeded, has the effect of making the total of

the engineering report prices exceed the total of the memorandum prices. For railroads as a whole the Memorandum 733 prices are adequate.

We shall show, we believe, to the satisfaction of all fair-minded persons that the costs reported by the carriers in the majority of cases contain a large amount of improper and questionable items, so that the result is not representative of the actual cost. If then, the prices applied by the Bureau in actual practice approximately equal the amounts found in these reported costs, it seems conclusive proof that the Bureau has been exceedingly liberal and that if any change is to be made, it should be in the direction of a more constant adherence to the range of prices set out in Memorandum 733. This is not to suggest that there are no exceptional cases where a departure from Memorandum 733 prices would be justified.

Contract prices are more reliable for estimating the cost of reproduction for tracklaying and surfacing

There are in general two types of data which can be considered in determining the cost of tracklaying and surfacing; contract data, and what we shall here call cost data, that is, the costs as reported by the various carriers for work performed by their own forces. The Interveners are relying on cost data and the Bureau finds contract data more useful as a check on its judgment prices. We feel, therefore, that a short discussion of these two types of data is necessary.

The Bureau in the early stages of the valuation work attempted to determine accurate prices for tracklaying and surfacing from a consideration of cost data. Bureau accountants made investigations extending over a period of several years in the effort to abstract from the carriers' books reliable information as to the costs to the carrier of tracklaying and surfacing. It was found, however, that due to the changes in accounting systems and to the manner in which the carriers' books were kept prior to the inauguration of any compulsory classification it was practically impossible to obtain from this source information which could be regarded as reliable. Cost data presented in previous hearings before the Commission have been found objectionable because of the inclusion of improper items and because of the impossibility of determining the propriety of the charges shown.

The Bureau's general criticism of carriers' cost data is applicable to the costs presented at this hearing. Disregarding for the moment the character of the construction projects, it will be noted by consulting Part IV of this brief that the costs reported for the various projects are replete with improper, questionable or doubtful charges, verification of which is impossible because of lack of records.

The Bureau in developing reproduction prices for other accounts uses both contract costs and carriers' cost data, but as to those accounts the cost

data are more accurate and reliable. It has found, however, that cost data are not satisfactory as a basis for determining prices for Account 12. The alternative is the contract data. This type of data is available in considerable quantity. There were presented in this hearing contract data on 234 projects involving over 10,000 miles of new construction. The Bureau has never taken the position that the contract data can be accepted blindly as an infallible guide to reproduction costs but has considered that they are the best available evidence of the actual cost of doing tracklaying and surfacing under the ordinary conditions encountered in new construction. Indeed, we do not understand that the Interveners here dispute the usefulness of contract data, but contend that such data show that Memorandum 733 prices are too low.

A consideration of the nature of contracts must lead to the conclusion that the prices named therein are entitled to great weight. Railroad contracting is seldom done by men who are not thoroughly familiar with the work and a contractor's bid reflects his mature judgment as to the amount for which he can perform the task, taking into consideration all of the elements likely to be encountered, as far as human foresight can reveal. A contractor is in business for profit and the prices found in a contract reflect the amount for which the contractor estimates he can do the work at a profit to himself. A contractor who accepts a contract for a piece of

railroad construction takes upon himself considerable responsibility and he realizes that an error of judgment will have to be paid for out of his own pocket. In other words he has sufficient confidence in his judgment as to the amount for which he can do the work to be willing to back it with his bank roll. If he hopes to remain in the business of railroad contracting he knows that he must perform his work to the satisfaction of the railroad company. On the satisfactory performance of every job, therefore, depend his reputation and future business possibilities. These are but a few considerations which lead to the conclusion that the prices named in a contract are the estimates of a man who knows his business and who believes the prices named will give him a profit on the work he is to perform. Of course, in some cases a contractor may lose money on a construction job, but it is to be expected generally that the price he bids is sufficiently high to protect him in some degree from contingencies and yet give him some margin of profit.

The Bureau has never contended that the contract prices can be used to build up a definite sum to be applied to tracklaying and surfacing. Memorandum 733, as we have already stated, was, when promulgated, based on all the data available, both carriers' costs and contract data, and was finally developed by the judgment of experienced engineers qualified to make such an estimate. The contracts are presented to show that the memorandum

prices check fairly well with the actual costs of doing the work as evidenced by the amounts paid to contractors. Neither has the Bureau contended that contract prices in all instances include the entire cost to the carriers for tracklaying and surfacing. Most of the contracts admittedly require the railroad company to furnish additional services such as work-train service, equipment, etc. However, the contract prices do indicate amounts for which contractors are willing to do tracklaying and surfacing on new lines and it is work on new lines which is most useful in determining proper prices for reproduction. No attempt has ever been made to start from the contract data and by a strict mathematical process arrive at a proper price. The best that can be secured is an approximation, and as will be pointed out in a moment, these contract prices properly considered check the prices set out in Memorandum 733. Any attempt to make a strict mathematical computation would be unavailing due to the fact that the vast majority of contracts for tracklaying and surfacing include work which is not properly chargeable to Account 12 under the classification, but which is comprehended in the contract unit price. Illustrations of these improper charges are set out in Exhibit 452 and it will be seen that in a number of instances the work so included must of necessity have aggregated a considerable amount.

It is not unreasonable to expect that the contract prices would include certain elements of work not

properly chargeable to Account 12 for the reason that this account does not coincide with the natural division of labor on a job. The contractor's price and the work included therein are based upon a consideration of the normal and natural way of performing the work without strict regard to the manner of accounting therefor. Facility and convenience in performing the work are never sacrificed merely for the sake of securing an accurate separation between the various accounts.

Criticism of a Bureau witness

The Bureau's testimony respecting the unit prices for tracklaying and surfacing was given by Mr. Saunders who was engaged in practical engineering work from 1899 to 1914, a good part of which was with the Union Pacific Railroad. He has been in the employ of the Bureau since 1914 and from the beginning has been engaged in the study and analysis of cost data respecting various phases of railroad construction, including the collection and study of costs of tracklaying and surfacing. We have already mentioned that most of the new railroad construction during the pricing period was in western territory and Mr. Saunders was fortunate enough to have made a study of cost data in the Pacific District of the Bureau during the period 1914 to 1921. The twelve years' intensive study of costs of tracklaying and surfacing, with the background of fifteen years' practical ex-

perience, which enables him to understand and apply cost data, qualifies him to express an opinion with respect to what the costs of tracklaying and surfacing have been and what they should be.

His study and analysis of cost data has not been narrowed to the study of costs on a single carrier, but his experience has given him a general and comprehensive knowledge of costs of tracklaying and surfacing for the country as a whole. Counsel seems to think that to be qualified to express an opinion as to the cost of tracklaying and surfacing, the witness must be some prominent railroad official. He accordingly belittles an opinion expressed by a mere Government employee who has the temerity to express views differing from those of carrier experts. (Br. p. 115.)

Counsel, in brief, makes an unwarranted and unjustifiable attack on witness Saunders. Throughout the brief his good faith is generally questioned. (Br. pp. 103, 112.) This is a matter of surprise to us coming as it does from eminent counsel. Mr. Saunders has been a trusted employee of the Commission for many years and during that time has impartially performed the duties that he has sworn to do without fear or favor. It would appear from this and similar criticisms of Bureau employees that one who dares to point out defects in carriers' costs or who has the temerity to express a view inconsistent with their position, is entirely unworthy of belief. Bureau employees have no object in per-

forming their duties other than to arrive at a result which is just and fair, and no motive other than to present the facts as they view them. Ordinarily such attacks are inspired as a resort to meet the evidence of the Bureau and this case is no exception.

THE CONTRACT DATA SUPPORT THE BUREAU'S PRICES

Mr. Saunders presented Exhibit 424 which embodies information concerning 361 prices for track-laying and surfacing found in 234 contracts. This exhibit is similar in its make-up to others presented in previous hearings and need not be described in detail. These contracts represent over 10,000 miles of new railroad construction during the period between 1900 and 1914. On this exhibit, there are shown opposite each contract the mileage of track built and the various unit prices set out in the contract with a brief description of the work covered by such unit prices.

These contracts relate chiefly to new construction, 10 miles or over, many of them including very substantial mileage, even as much as several hundred miles. Of the total, 9,633 miles were new first track, and an additional 1,000 miles were new second track. Contrast this data with the projects presented by the Interveners in this proceeding. They place their entire reliance upon 74 projects which include 7 line changes, one of which is less than 10 miles in length; 20 additional track projects, 8 of which are less than 10 miles; 7 yard projects,

one of which is less than 10 miles and 4 of which were constructed in piece-meal fashion; and 8 projects of new work which were less than 10 miles in length. There can be no room for argument as to the more representative character of the contract data, and, therefore, as to the more secure foundation upon which the Bureau can rest its judgment. Furthermore, examination of any typical set of specifications for tracklaying and surfacing shows very clearly that the type of work covered by the contracts is in general accord with the theory followed by the Bureau; that is, they contemplate that the track as turned over by the contractor shall be a *new* track, exactly as the Bureau considers would be done in reproduction. The Interveners' data, as previously stated, are not developed on this theory, and can not be applied in estimating the cost of reproduction new of a new track.

The Interveners were furnished all the data in the possession of the Bureau underlying Exhibit 424. These consisted of contracts, specifications, final estimates, or abstracts; one or more in each case. Mr. Saunders' work sheets on which he arrived at certain averages were also furnished and are in the record as Exhibits 427 and 428. The Interveners, therefore, have had a full opportunity to consult and study the data relating to *all* the projects included in the Bureau's evidence.

It has been, and is, the Bureau's position that the study of tracklaying and surfacing costs should not

be confined within any particular geographical limits. The only material difference to be expected because of the location of the work is the extra expense of transportation incurred where the work is some distance away from labor centers. This fact logically would operate to increase such costs in the western territory where most of the contract projects are located. In estimating reproduction costs, the first requisite is to find construction projects which are in some measure comparable to reproduction. Very few such projects are to be found in the East. The data presented by the various carriers in this case offer ample proof of the situation in the eastern territory. In the West, however, there has been considerable new construction since 1900, and most of it has been new work rather than the expansion and revision of existing lines. The various construction projects are in a number of cases of a substantial amount of mileage. Considering these facts it will be readily observed that the western data are extremely useful as a basis for estimating reproduction costs.

The Interveners in this case, however, seek to confine consideration only to projects roughly east of the Mississippi, and north of the Ohio and Potomac Rivers. In taking this position, as before stated, they depart from their former position, taken at an early hearing in this case by their own expert, Mr. Hale, Engineer of the Eastern Group. (Tr. p. 493.) The Bureau has always taken the same view as then expressed by Mr. Hale, and

considers it is as true now as it was at the time he gave the above opinion. Consequently, it makes use of data available from all sections of the country, and thus is able in estimating prices for a territory where there are little representative data available, to take advantage of information derived from a consideration of projects more clearly comparable to reproduction.

The contracts varied widely as to the nature of the work to be performed by the contractor. The contract prices were separated into groups according to the nature of the work covered. Where the contract definitely provided that the work to be performed was tracklaying only, the prices were grouped under that heading, and in those instances where the information was indefinite, the prices were grouped under the heading "tracklaying not specified." The prices in this latter group undoubtedly include in many cases work other than tracklaying solely, but in order to be fair, these prices were used as if they included only tracklaying. Likewise, where the contracts definitely state "tracklaying and running surface," they are grouped under that heading, but in those instances where the information is indefinite, the prices are shown under the heading "tracklaying and surfacing." This latter group was treated by Mr. Saunders as being for tracklaying with running surface, although undoubtedly in many instances a full earth surface was applied.

The same conservative classification was made in the case of the other groups. This method of grouping, of course, has the tendency of increasing the average contract prices for the various elements of work performed, and leads to results which are most favorable to the Interveners.

The Bureau has at no time contended that the contract prices in its possession represent the total cost of tracklaying and surfacing to the railroad company. In a very small number of cases, it is true the contractor bore all the expense of the work and nothing whatever was done by the railroad company. In the great majority of cases, however, some services were furnished by the railroad, such as work-train service, equipment, or transportation, etc. The Bureau has recognized in its consideration of contracts that there are certain expenses sometimes incurred by the carrier after the contractor has completed his work and has realized that some amount varying with the individual cases, should be added to the contract price to cover such items as maintenance prior to operation and incidental work-train service.

Counsel in brief states that some of the projects presented by the Interveners in this case were offered merely to show that the contract prices in the Bureau's former contract exhibits did not constitute the complete costs to the carrier. The Bureau has never denied that there was additional work done by the carrier on these projects; neither

has it ever used the bare contract prices as the sole basis of an estimate of the cost of tracklaying and surfacing. Consideration has in all cases been given to the other items of expense which must be added to the contract price to complete the total cost of Account 12.

In addition to the variations as to the work performed, the contracts also varied widely as to the nature and amount of services furnished free to the contractor by the railroad company, and the groups were further classified according to the nature of service furnished. In a small number of cases all of the work was done by the contractor without any assistance from the company. As previously stated, however, in the majority of cases some assistance was given to the contractor, generally in the form of transportation, work-train service, or equipment. The contracts where all the expense was borne by the contractor were grouped together in a column headed "all expense"; similarly the other contracts were grouped under appropriate columns. These different groupings were not shown in Exhibit 424 but were testified to by Mr. Saunders during his direct examination. Subsequently his original working sheets were introduced by Interveners as Exhibit 428, after a corrected and revised grouping had been presented by the Bureau as Exhibit 427.

In order to make comparisons between these different types of contracts, Mr. Saunders then aver-

aged the tracklaying and surfacing prices found in the various groups. These averages were made for comparative purposes only (Tr. p. 6445) and no attempt was made by Mr. Saunders to build them up, by any process of strict mathematical computation, to the prices used by the Bureau of Valuation. As suggested above, this would, of course, be impossible because of the inclusion in the contract prices of improper items, the amount of which could only be very roughly estimated.

In order to form any judgment from these contracts, consideration should be given to all of them and should not be confined to any one type of contracts to the exclusion of the others. Counsel attempts to show by the use of only the "all expense" contracts that Memorandum 733 prices are not sufficiently high for tracklaying and surfacing. In so doing he utterly ignores the prices stated in the greater proportion of the contracts, all of which must be considered. Counsel's procedure in attempting to break down the Bureau's prices by considering only a few contracts is entirely in consonance with his method of building up the affirmative case of the Interveners in which, as heretofore explained, the most important part of their pricing schedule is determined from consideration of very meager data. The contracts which are most useful as a basis for estimating costs are not the few attacked specifically by counsel, but rather are those which comprise the more usual class of contracts; that is, those in which the

railroad company furnished certain services, for example, transportation.

In Table II we have shown the various groupings of contract prices relating to tracklaying, surfacing, or tracklaying and surfacing with these groups further classified according to the services furnished. This latter classification was made merely to give a general idea of the services furnished by the carrier and it was not the purpose to definitely build up prices in this manner. If this had been the purpose, it would have been necessary to have further segregated the prices under the heading "equipment furnished," as in this grouping were placed all contract prices where some equipment or work-train service was furnished whether only one car or all of the work-train service. It will be seen from a glance at Table II that the average contract price for tracklaying with running surface is in the neighborhood of \$500.

TABLE II

	Col. 14— Tracklaying and running surface		Col. 16— Tracklaying and skele- ton surface		Col. 10— Tracklaying and sur- facing		Col. 23— T. L. & S. without ballast		Col. 11— T. L. & S. without ballast	
	Number of jobs	Average price	Number of jobs	Average price	Number of jobs	Average price	Number of jobs	Average price	Number of jobs	Average price
All expense included.....	8	\$473			8	\$632				
Rent of equipment omitted.....	2	265	1	\$375	5	566			2	\$400
Transportation omitted.....	6	385			13	496	1	\$625	1	425
Service furnished uncertain.....					4	638				
More than one of preceding omitted.....	3	383	2	300	18	490	11	688	4	546

TABLE II—Continued

	Col. 8— Tracklaying not specified		Col. 7— Tracklaying only		Col. 9— Surfacing only		Col. 13— Running surface		Col. 15— Skeleton surface only	
	Number of jobs	Average price	Number of jobs	Average price	Number of jobs	Average price	Number of jobs	Average price	Number of jobs	Average price
All expense included.....	16	\$565	7	\$449	2	\$383				
Rent of equipment omitted.....	20	479	10	365	5	186				
Transportation omitted.....	6	348	16	308	14	258	1	\$125	1	\$100
Service furnished uncertain.....	1	500	2	550						
More than one of preceding omitted.....	13	322	40	294	18	244	8	108	8	168

While recognizing that the contract prices do not represent complete costs in the majority of cases, the Bureau also takes into account the fact that the contract unit prices for tracklaying and surfacing very frequently include work which is not a proper charge to Account 12 under the classification. A list of the work which is improper to Account 12 yet which is covered by these contract prices is set out in Exhibit 452. These improper charges are generally in the nature of work in the material yards unloading, storing, and handling track material, which is a proper charge to the material accounts; unloading ballast chargeable to Account 11; securing surfacing material chargeable to Account 3; placing road crossings, mile posts, and signs chargeable to Account 15. The ballasting prices in some cases include in addition to placing the ballast the production, hauling, and unloading of it, which is, of course, not chargeable to Account 12.

It is very seldom that the contract price for ballasting includes only Account 12 costs.

The Bureau has never found it possible to make definite estimates as to the amount of money represented in these improper Account 12 items and, therefore, has not attempted to make any deduction on account of them, although it has considered them in reaching its conclusions. Some idea of the amount of money which they represent, however, may be gained from a consideration of the prices used by the Bureau for items of this nature in the material accounts. The Pennsylvania Railroad in presenting its exhibits recognized that its Account 12 costs included material yard handling and made a deduction, basing its estimate on Bureau prices, of from \$149 to \$174 per mile. Contract prices for handling track material, where set out separately in the Pennsylvania contracts varied from \$100 to \$300 per mile. Thus it will be seen that where this item is included in the contract unit price for tracklaying and surfacing a very substantial adjustment must be made before any accurate conclusions may be drawn. Of course, only a few of the contract prices for tracklaying include all the material yard expenses, but in a great number the loading of material is contained therein. Exhibit 452 indicates the extent to which handling charges are involved in the tracklaying unit price. Similarly, the work of securing surfacing material in many cases may amount to a very substantial item and this must be

taken into account in any judgment based upon the contract prices.

Counsel suggests that the pointing out of these improper items was merely an afterthought and that they had never been discovered by the Bureau until the closing days of the hearing. Since the facts are so obvious we would pass his statements with very little comment were it not for the emphasis he lays upon this suggestion at pages 101 to 104 of his brief, where he recites his version of the birth of this idea that improper charges were contained in the tracklaying and surfacing prices.

Counsel for the Bureau are utterly unable to understand why distinguished counsel finds it necessary to misstate the facts. We can only conclude that counsel in his zeal to present his case has misunderstood the record. The nature of the contract study is well known to the Commission and to the carriers. It has been presented in several prior cases. Time and time again the fact that the contract prices covered work not proper to Account 12 was emphasized. The Boston & Maine intervened in the N. Y. P. & N. case and was there represented by the same counsel. Testifying in that case on a day when the record shows counsel was present and participated, Mr. Saunders pointed out that the contract prices for tracklaying and surfacing included charges proper to Accounts 3, 8, 9, 10, and 11. (N. Y. P. & N. Tr. pp. 447, 448.) Similar statements were made by Mr. Saunders in the Du-

luth, Missabe and Northern case which was also referred to by counsel during the cross-examination. The commission in its decision in the N. Y. P. & N. case mentioned the fact that these prices called for work not properly chargeable to Account 12. (97 I. C. C. 294.)

The Interveners at the conclusion of Mr. Saunders' direct examination were presented with the contracts themselves which underlie Exhibit 424 and if counsel had read even a few of these contracts, it would have become perfectly apparent to him that the contract prices were not confined strictly to Account 12 charges. Apparently counsel's real complaint is that the facts were brought out.

After making averages of the various groups of contracts, giving consideration to all rather than to a few, and after considering that the unit prices in many cases cover a substantial amount of work not properly chargeable to Account 12, Mr. Saunders reached the conclusion that the cost of doing tracklaying and surfacing work by contract was somewhere between \$500 and \$600 per mile. This price, however, in a number of cases, does not include all the cost of maintaining the track after it is accepted by the carrier and before the beginning of operation. Nothing definite can be determined as to the cost of this item which varies according to circumstances. Mr. Saunders believed that this item would not exceed \$200 per mile in any case and

the average would be a great deal less than that amount. For other incidental costs which might be incurred such as extra work train service, etc., and which are not covered in the contract price, Mr. Saunders suggested that an amount of \$100 per mile might be arbitrarily adopted. This item, of course, would be very minor in those cases where the contractor bore all the expense of tracklaying and surfacing.

Mr. Saunders definitely and explicitly stated time and time again that the maximum to be added to the contract prices in no case should exceed \$200 per mile for maintenance and \$100 per mile for incidental, and that in some cases nothing should be added. Stated differently his testimony is that the amounts to be added to the bare contract prices for both maintenance and any other extra services ordinarily paid for by the carrier would range from nothing to \$300, the maximum being added only for the highest type of construction. Counsel erroneously quotes Mr. Saunders as admitting that \$300 to \$500 must be added before the complete costs can be obtained. This statement finds support only in a suggestion made by counsel during the hearing.

Considering all these factors, Mr. Saunders reached the conclusion that the average contract price for tracklaying and surfacing plus all additives for extra services lies well within the range of Memorandum 733 prices, that is, from \$825 to \$1,000 per mile. Even with the addition of liberal

amounts for the items last discussed, it was found that it would be rather difficult to build the contract prices up to the range of the memorandum and to the prices adopted in the engineering reports, when consideration was given to all of the available contract data and to the fact that the unit prices include sizeable amounts for items which are in no way proper to Account 12. The conclusion to be drawn from the contract data therefore is that the prices set out in Memorandum 733 are sufficiently liberal to cover the cost of doing tracklaying and surfacing. As we have heretofore reiterated, the exact amount to be derived from a consideration of the contract prices can not be determined with mathematical accuracy and no attempt to do so has been made. All that has been done is to consider the prices stated in all the various types of contracts, as well as the improper charges to Account 12 included therein and the conclusion is reached that the average cost to contractors is in the neighborhood of \$500 to \$600 per mile. After a consideration of the average contract prices, it appears that the Bureau has been very liberal in those cases where it has applied prices in excess of the maximum of Memorandum 733.

INTERVENERS CRITICIZE COMPARATIVELY FEW OF THE CONTRACT PRICES

As we have already explained, in most cases the carrier furnished to the contractor either transportation of men or supplies, or work-train serv-

ice, or equipment, or a combination of two or more services depending upon the arrangement made. There are very few contracts where the contractor furnished everything and those contracts have been referred to as the "all expense contracts." Out of the 361 prices, only 23 of such contracts relate to the separate item of work, "track-laying," and only 2 to "surfacing." Counsel emphasizes in brief the fact that Mr. Saunders' work sheets, on which he arrived at various averages of contract prices, were twice revised at the hearing. These revisions were made in accordance with the expressed desire of the Bureau to make the exhibit as accurate as possible. (Tr. p. 7022.) It is not unlikely, in the compilation of such a large mass of data that errors will creep in, and the Bureau welcomes an opportunity to make what corrections are necessary. We appreciate the assistance of counsel in bringing to light the errors which existed in the original tabulation. We assume that the Commission is interested in the merits of the data, and will discuss only the exhibit as finally revised.

The Interveners, in brief, as previously stated, confine their discussion almost exclusively to the few "all expense" projects. Without any evidence to support the statement, they characterize these projects as the most important ones in the contract study. In substance the entire criticism, both at the hearing and in brief, was directed at these few contracts. It is not difficult to find the reason why

they have ignored about 200 contracts and confined their criticism to a few. It appears to be an effort to divert the attention of the Commission from the convincing proof found in the contract study as a whole.

We have heretofore called attention to the fact, repeatedly emphasized by witness Saunders, that consideration must be given to all contract prices, and that no mechanical formula or mathematical process, such as adding or subtracting various combinations of figures can develop a price proper to use. The contracts vary so widely, both in prices, character of work in the contract, and the character of the services furnished by the carrier, that almost any result may be obtained by making various combinations. Mr. Saunders repeatedly stated that all contracts were considered, and developed certain averages for comparative purposes only. (Tr. p. 6445.)

Counsel seizes on this "comparison" of a few "all expense" tracklaying jobs, about 10 per cent of the total, and after a mathematical calculation, arrives at the conclusion that the contract data "checks" with the exorbitant reported costs for the few line revisions and similar work reported by the carriers. He discards all other contracts without any adequate explanation, and there is no attempt to criticize the remainder of these contracts.

Counsel for the Interveners exerts every effort in brief to show that the contract data in reality sup-

ports an average contract price of \$700 to \$800 per mile for tracklaying and surfacing rather than \$500 to \$600 as testified to by Mr. Saunders. His method of attempting to show the accuracy of this price is little short of astounding. It is the Bureau's position as has been stated before that no mathematical computation of the contract prices can lead to correct results. Counsel, however, attempts to use certain averages, testified to by Mr. Saunders as useful for comparative purposes, to build up a definite and positive price.

In our discussion of the Interveners' pricing schedule, we have referred to counsel's predilection for basing conclusions on meagre data. That part of the Interveners' pricing schedule which would be applicable to a large proportion of the mileage in eastern territory was developed by the use of only 10 short construction projects. The attempt to break down the Bureau's proof is founded upon a consideration of even a smaller number of cases. There is no possible way of reaching an average contract price in the neighborhood of \$700 or \$800 without resorting to the use of *only two* contract prices for surfacing. In other words his whole condemnation of the Bureau's prices rests on *two contract prices* out of a total of several hundred prices found in 234 contracts. This effort would be ludicrous were it not urged with apparent seriousness.

The table below shows the "all expense" contracts used by Counsel:

"All Expense" Jobs (Revised Averages)

	Ave. price	No. of jobs
Col. 7. Tracklaying only.....	\$449	7
Col. 8. Tracklaying "not specified".....	565	16
Col. 9. Surfacing only.....	383	2
Col. 10. Tracklaying and surfacing.....	632	8
Col. 14. Tracklaying and running surface.....	473	8

At the hearing Mr. Saunders did not discuss in detail the meaning of the items in the various contracts, since he did not intend to make any mathematical application of any of the averages. Since counsel has seized on these few averages, it seems necessary to point out obvious considerations to which weight must be given before any conclusion can be reached from these prices and before the fallacy of Counsel's conclusion can be understood.

To understand clearly the groupings it might be well to explain that in the case of a ballasted track a "running surface" or "skeleton surface" is applied after tracklaying which consists merely of throwing sufficient dirt under the rails and ties to hold the track in place so as to permit the operation of work trains prior to the placing of ballast. (Tr. p. 6333.) In most instances it is found that a running surface is applied as an integral part of the tracklaying program and by the same contractor, as it is not a process that requires much work. In fact, many carriers do not apply a running surface but block up the track where inequalities in the surface occur. Many of the Pennsyl-

vania exhibits in this record contain charges for such work. On the other hand, what is known as a "full earth surface" is the full ballasting of the track with dirt instead of stone, cinders, etc. Obviously the cost of "earth surface" must be several times that of a "running surface." In truth, the Western Group Committee claims only \$75 per mile for the application of a running surface, whereas it claims over \$300 for an earth surface. (D. M. & N. Ex. 76.)

We have already mentioned that many of the contracts were somewhat uncertain as to the exact work to be performed. In Column 7, shown in the above table, were listed those contract prices where the contracts definitely show that the work performed by the contractor was "tracklaying only" and in Column 8, those contracts which covered tracklaying work without stating in exact terms the full extent of the work to be performed at the unit prices. Under Column 14 are included those contracts which definitely show that the work to be performed is "tracklaying with running surface" and under Column 10 those contract prices where it is provided that the work shall be tracklaying and surfacing, but with no definite information as to the kind of surfacing. There remains only Column 9 and under this column were included those contracts which provided for "surfacing only." These *two contract prices* are important for upon these two alone rests Counsel's claim that the average con-

tract price for tracklaying and surfacing is between \$700 and \$800.

Counsel in brief shows in Table B (Br. p. 88) what purports to be the result of certain of Mr. Saunders' averages. For convenience, there is set out below the combinations (revised) of the columns above mentioned which produce what purports to be tracklaying and surfacing prices.

Col.	Total	Total No. of Jobs	Ave. Price
7+9. "Tracklaying only" plus "surfacing only".....	\$832	9	-----
8+9. "Tracklaying not specified" plus "Surfacing only".....	948	18	-----
Simple average of above (Group II).....		27	\$890
10. "Tracklaying and Surfacing".....	632	8	-----
14. "Tracklaying and running surface".....	473	8	-----
Simple Average of above (Group I).....		16	553
Simple Average (Group I and II).....		43	721

It will be observed that the average price for "tracklaying only" was combined with the average price of the *two* contracts for "surfacing," column 9, and likewise the average price for "tracklaying not specified" was combined with the average price of the same two contracts for surfacing. Both of these combinations purport to represent a tracklaying and surfacing price. These two totals were averaged and the result is the average price for tracklaying and surfacing of Group II of \$890.

The average of \$632 for "tracklaying and surfacing" under column 10 was combined with the average of \$473 for "tracklaying and running surface" under column 14 and divided by two which produced the average price for tracklaying and sur-

facing under Group I, \$553. The latter average is then combined with the former average derived in a different way for tracklaying and surfacing and what purports to be a grand total average of all combinations of contracts in the "all expense" column which will give a price for tracklaying and surfacing is made and the result is shown as \$721.

The average of these *two surfacing jobs* was combined with the various tracklaying jobs as above stated. It thus appears that in all cases where an average of tracklaying and surfacing is obtained by adding the separate elements together, the effect of the average of \$383 for these two contract prices for surfacing is felt. That these two contract prices are sufficient to be representative of the several hundred prices found in the 234 contracts and to form a basis upon which to draw any reliable conclusion is most absurd, yet Counsel most emphatically asserts that his conclusions built up on the use of *only two* contract prices must be taken as accurate. This procedure serves only to bring into bolder relief his disregard of the vast majority of the contract prices in the exhibit. For the reason that his conclusions are built up on the necessary use of *only two prices* they should be given no consideration. An analysis of the contracts serves to illustrate clearly the danger of considering such a small number of prices.

We think it obvious that the two surfacing prices should not be added to tracklaying prices to produce a combined price for tracklaying and running sur-

face in utter disregard of all other prices, especially since the two prices mentioned apparently refer to *full earth surface* as distinguished from the light and simple operation of applying a running surface. It is singular that Counsel has overlooked this feature in stressing these combinations. An examination of the contract Exhibit 424 shows that there are only three columns relating to surfacing: Column 9, "Surfacing only," column 13, "Running Surface only," and column 15, "Skeleton surface only." It is obvious that the only possible place where contract prices for full earth surface could be classified is column 9, "Surfacing only." The exhibit shows that a large number of the contracts in this column are for full earth surface. Others in the column bear no definite description, but a comparison of the prices indicates clearly that a large number of the contract prices set out in this column probably refer to a full earth surface. With this in mind, therefore, any combination of a tracklaying price with the average of two surfacing prices would give as a result a price for tracklaying *and full earth surface*.

Reference has previously been made to the fact that the claim of the Western Group Committee for "running surface" is only \$75 per mile. This would seem to be additional proof, if any is needed, that the two contracts which average \$383 must be for something more than the placing of a mere running surface. This is perfectly obvious by comparing the results of the erroneous process which produces an average figure of \$890 per mile for tracklaying

and surfacing for Group II with the average for Group I of only \$553 per mile, where the contracts clearly provide for the complete operation of "tracklaying and surfacing" in one unit price. We do not think that this is particularly important except to illustrate the incongruous results which come about by attempting through a mathematical process to use two contracts to arrive at a definite price. All the contracts must be considered.

We have pointed out that the Bureau does not sanction any mathematical process of attempting to arrive at an average price for tracklaying and surfacing by various combinations of these contract costs. The contracts can be used only as a foundation for judgment. However, in order to illustrate the erroneous conclusions drawn by the Interveners, we are suggesting combinations which more nearly represent a proper combination of the "all expense" projects. The most that should be added to the average tracklaying prices under columns 7 and 8 for a running surface would be \$75, the amount claimed by the Western Group Committee in their pricing schedule. Substituting this amount for the average price of the two contracts in column 9 of \$383, the simple average of Group 2 would be \$582, which is not out of line with the simple average of Group I of \$553, where the nature of the work is definitely known. Thus there would be produced a simple average for Groups I and II for tracklaying and surfacing of the "all expense" projects

of \$568 instead of \$721. The "all expense" group properly analyzed checks Mr. Saunders' estimate.

In concluding that the contract data support a price of from \$1,000 to \$1,300 for tracklaying and surfacing counsel goes through four steps; he builds the "all expense" average up to \$721 by the use of *only two* surfacing prices; he then weights the averages, giving additional weight to these *two* prices, and gets an amount in the neighborhood of \$800; he then ignores entirely the fact that a substantial amount of work improper to account 12 is included in the contract prices; and finally brings the price up to a maximum of \$1,300 by the addition of \$500 to cover maintenance, etc., an amount which is purely imaginative, and finds no basis in any testimony in the case. The mere recital of the various steps to which counsel finds it necessary to resort is sufficient condemnation of his conclusions.

We have discussed the effect upon the average price of tracklaying and running surface for the "all expense" contracts caused by the erroneous use of two surfacing jobs to the exclusion of all others. It will also be observed that the average price for tracklaying and surfacing for the contracts in "equipment omitted" group is \$471, for "transportation omitted" \$486, and for "several omitted" \$476. These must also be considered. For instance, the contracts under the head "transportation omitted" are equally as good an index of the cost of tracklaying and surfacing as are the few

"all expense" jobs. In the Eastern Group the item of transportation is necessarily minor as the projects are not far distant from labor markets. The Wabash in its exhibits estimated the cost of transportation to be 4 per cent of the labor cost. Applying this percentage to the average of the contract prices classified as "transportation omitted," it will be seen that the result is not far from \$500.

THE INTERVENERS' CLAIM FOR MAXIMUM MEMORANDUM 733 PRICES FOR PLACING BALLAST IS WHOLLY UNSUPPORTED

It is significant that the Interveners make no attempt in brief to support their claim for placing ballast by a discussion of any evidence which they have presented, although most of the 149 projects were ballasted tracks. Undoubtedly the cost of placing ballast on many projects could have been separated from the total costs and they could have, if they had so desired, given the Commission this information. One of two conclusions must be drawn from their failure to use the costs of placing ballast developed from their own data; either (1) they realized the sufficiency of the prices ordinarily applied by the Bureau for placing ballast, or (2) the recorded costs were not sufficiently detailed to permit a separation, and this would tend to discredit the entire cost study. Their claim with respect to ballasting prices seems to be in harmony with their general policy of asking the maximum in every case.

As the Interveners made no application of their data with respect to the cost of placing ballast, it was not considered necessary for the Bureau to support its prices by testimony, and the only testimony presented as direct support of the prices for placing ballast was with reference to stone ballast. The memorandum 733 prices for placing stone ballast range from 25 cents to 35 cents with provision, however, that judgment is to be exercised in the application of the schedule. The Bureau introduced Exhibit 426 showing the cost of placing 3,172,856 cubic yards of stone ballast on 23 construction projects in Western territory. The weighted average cost on these 23 projects for placing ballast was 29.5 cents, slightly lower than the average price provided for in Memorandum 733. This large amount of data is unassailed and presents conclusive proof of the accuracy of the Bureau's prices for placing stone ballast.

Counsel dismisses this exhibit in brief with scant attention because (1) it relates only to Western territory and the Interveners have taken the position in his proceeding that data from that section of the country are not useful, which is a reversal of their former position; (2) the Western Group carriers ask more than 29.5 cents for placing stone ballast; and (3), if counsel had cross-examined, more than likely the exhibit would show the opposite from what it was offered to prove. This last suggestion has no other support than counsel's imagi-

nation. It should be observed that even the *claim* of the Western Group for 33 cents is less than the maximum sought by Interveners. Referring to the D. M. and N. case to which counsel points as the source of his information (Br. p. 113), the Bureau found in that case from those instances where it was furnished the underlying data in support of the 33 cent claim that the weighted average cost was 31.9 cents per cubic yard for placing rock and slag ballast, for which Bureau prices range from 25 to 35 cents, and 22.5 cents for placing gravel and miscellaneous ballast, the material priced in Memorandum 733 at 20 to 25 cents per cubic yard.

There are two other exhibits offered by the Bureau which contain references to the cost of placing ballast, Exhibit 425, and sheet 5 of Exhibit 427. The contract exhibit contains 63 contract prices for a combination of placing ballast together with some other elements of work properly chargeable to Account 11, such as production costs, loading, hauling, or unloading the ballast and, in many instances, more than one of these Account 11 costs. Mr. Saunders attempted to analyze as far as possible the contract prices which provide for a combination of Account 11 work and placing ballast in Account 12. It was not possible to use these prices in direct comparison with the Bureau prices for placing ballast because there was no accurate way to deduct from the contract prices the actual cost of doing the Account 11 work so that the remainder will represent only the Account 12 costs. While Exhibits 425

and 427 do not compare the Bureau's prices for placing ballast with the contract costs for the same work, they are very illuminating. Sheet 5 of Exhibit 427 compares the contract prices for various combinations of Account 11 work and placing ballast in Account 12. Mr. Saunders deducted from each of the contract prices the Bureau's prices for the items of Account 11 work included in the particular contract. The remaining part of the contract price after making the deduction indicated does not purport to represent the actual cost of placing ballast and no application was made of these resulting figures. This tabulation does show very plainly, however, that either the Bureau's unit prices for placing all kinds of ballast are too liberal or that its Account 11 unit prices are excessive, or that both are too high. Counsel attempts to confuse the issue and ridicule this comparison in brief, but in so doing emphasizes the very point for which the exhibit was presented. For instance, in project 32, the first one shown on this tabulation, the contract price of 39 cents covered the placing of gravel ballast, as well as the loading, hauling, and unloading of the ballast.

In the engineering report for the valuation section where the work was done the Bureau estimated the cost of loading, hauling, and unloading of the ballast in Account 11 at 30 cents. Deducting this amount from the total contract price there remains only 9 cents for the work of placing ballast. Anyone with intelligence would not suggest

that this represents the cost of placing ballast, but this illustrates very strikingly that the Bureau's prices for some of these operations must be grossly excessive. Counsel emphasizes this comparison when he states that 37 of the "placing ballast" figures show 10 cents or less. Each of the individual elements of work must have been too high.

Exhibit 425 also presented information with reference to the cost of placing ballast. In this exhibit the contract prices were separated into four groups according to the kind of ballast; gravel, stone, cinders, and miscellaneous. We have already mentioned that substantially all of the contract prices covered a combination of items of work; that is, the unit price covers all costs properly chargeable to Account 12 for the placing of ballast and in addition certain other costs properly chargeable to Account 11, so that it was impossible to make a direct comparison with the price for placing of ballast in the engineering report. A comparison, however, was made between the contract prices and the amounts shown in the engineering report for the same item of work in *both* Account 11 and Account 12.

In order to make such a comparison it was necessary to adjust the sum of the engineering report prices for both accounts by deducting the Bureau prices for elements of Account 11 work not covered by the contract price. In other words, theoretical costs were deducted from theoretical costs

and not "arbitrary" figures or estimates as stated by counsel. (Br. p. 106.) Counsel makes another inaccurate statement when he says that the remainder represented "the amount allowed in the engineering report for the proper Account 12 costs included in a contract price." (Br. p. 106.) Such is not the fact. The only comparisons made were between contract prices covering combinations of Account 11 and Account 12 work with amounts used in the engineering report for the *same items of work*. This exhibit does not purport to prove, as assumed by counsel, that the Bureau's prices for placing ballast are adequate, but was presented merely to give a general indication of the comparison between the Bureau prices for doing work comparable to that contained in the contract prices.

Of these combination prices, 41 covered prices for the placing of gravel ballast together with the item or items of work properly chargeable to Account 11. The weighted average price in the engineering report for the same items of Account 11 work and placing ballast, Account 12, was 34 cents as compared with the weighted average contract price of 31 cents. While this comparison does not definitely show that either the Bureau's price for placing ballast in Account 12 or the Bureau's price for the items in Account 11 is correct, it does indicate that the total or combined unit prices for the Account 11 and Account 12 operations are more than adequate.

Counsel apparently has not made a serious attempt either at the hearing or in brief to discredit the prices applied by the Bureau for placing ballast. In accordance with his usual practice he has concentrated his criticism of the prices for placing gravel ballast on only one contract, Index No. 86. In this particular case he attacked Mr. Saunders' interpretation of what the price of 35 cents was supposed to include. Even granting that counsel is right and that the 35-cent price shown under Index No. 86 is an Account 11 cost exclusively, rather than an Account 12 cost, the removal of this project from Exhibit 425 would result in a difference of only about one cent per cubic yard, which can hardly be characterized as "material" as counsel would have the Commission believe.

Counsel gratuitously assumes that other prices set out among the 63 in Exhibit 425 have been erroneously interpreted, but it is significant that he does not point out or discuss any of them. The only possible way in which the proof of the adequacy of the memorandum prices can be disputed is by proving that the contract unit prices do not include the Account 11 items which Mr. Saunders states. In spite of the obvious necessity of proving the incorrectness of Mr. Saunders' statements in this regard, counsel in brief can point out only this one contract in which he contends Mr. Saunders had made an erroneous interpretation. If there were defects or errors it is not improbable that counsel would call them to the Commission's atten-

tion inasmuch as he has had full opportunity to examine the contracts and other information supporting these prices.

In addition to the data contained in Exhibit 426 as to ballast, further information may be found in Exhibits 425 and 427; that is, comparisons of the contract prices with the amounts set up in the engineering report for the same items of work in Accounts 11 and 12. Again we must emphasize that these exhibits do not set out what purports to be a separate contract price for *placing* the ballast as compared with the engineering report price. The contracts for placing stone ballast were on the Pennsylvania. Mr. Saunders' review of these contracts indicated that the contractor in addition to unloading the ballast in a number of cases furnished an indeterminate amount of work train service distributing ballast. For this reason he stated that no definite conclusions could be drawn from these Pennsylvania contracts. It is likewise true that most of the contracts for placing cinders and miscellaneous ballast were Pennsylvania contracts where the above situation also existed. Counsel criticises Mr. Saunders for stating that this particular exhibit with reference to stone ballast was not very valuable in arriving at a final determination. In answer to this criticism it is sufficient to point out that of the 149 projects presented by the Interveners as cost data on tracklaying and surfacing, only 74 or approximately one-half were presented in the summaries as being useful in the de-

termination of a proper price. The other half were discarded as not presenting useful information.

In conclusion we again emphasize that counsel has made no application of the cost data contained in his 149 exhibits in support of any price. His attempt to show that the Bureau prices are insufficient is not convincing when the actual facts developed by a comparison of the contract prices with the total amount allowed by the Bureau in Accounts 11 and 12 for the same items of work are considered.

The cost per cubic yard for placing ballast decreases as the quantity increases

Mr. Saunders mentioned during the course of his testimony that the cost per cubic yard of placing ballast decreases as the amount of ballast increases, and referred to Index No. 90 in the contract exhibit in which it was provided that the contractor should receive 33 cents per cubic yard for a 6-inch lift of ballast, 31 cents per cubic yard for an 8-inch lift, and 27 cents for a lift over 8 inches. Counsel seems to make an issue out of this question for some unknown reason, and would make it appear that this variation in price, decreasing as the amount of ballast increases, might be due to a decreasing cost in the pit work rather than a variation in cost of the placing due to increase in quantities. He forgets that the total quantity to be placed on a line would be the same whether it was applied in 6-inch or 8-inch lifts. In other words, the way

in which the ballast is applied does not affect the total quantity applied and, therefore, there should be no variation in the cost of production for such a reason.

A consideration of the way in which we understand ballast is applied must lead to the conclusion that there is not as much work necessary on the first lift as there would be on the second or third lift. The first lift is, to be sure, tamped closely around the ties to insure an even running surface but no attempt is made to dress up the ballast. The final lift on the contrary does require very careful tamping and surfacing and must be in perfect condition before the track is turned over for operation. A final lift is required irrespective of the total quantity of ballast placed. Very little work need be done on the first lift beyond the ends of the ties. The variation in cost comes about through the depth of the ballast. It would be the most economical process to unload and place as great a quantity of ballast as possible on the first lift. It appears obvious that the greater quantity would be placed in the first 6 inch lift than on succeeding lifts of the same depth, because the width of the ballast section decreases the nearer it comes to the rail. Consideration should also be given to the fact that on a roadbed which contains two or more tracks there is a large amount of ballast between the tracks which does not require the careful tamping necessary for ballast which is immediately under the rails.

Counsel calls attention to Index No. 69 in Exhibit 424 in which there was provided a contract price of \$200 per mile for the first lift and \$200 per mile for the second lift (Br. p. 114) and draws the conclusion from this that there is no variation in the cost of placing ballast as the quantities increased. It will be observed that these prices are per mile prices. We have pointed out that ordinarily a greater quantity of ballast is placed on the first lift than on the second lift, the track being raised the same distance at each lift. This being so, the \$200 per mile for the first lift covers a greater yardage than the same per mile prices for the second lift, and consequently the per cubic yard price is increased for the smaller quantity. We appreciate counsel's contribution to the Bureau's proof.

Conclusion

A thorough and impartial consideration of the contract prices for tracklaying and surfacing can lead to no other conclusion than that the range of prices stated in Memorandum 733 is adequate. The Interveners have attempted to obscure the bulk of the useful information found in the contracts by directing attention to only a minute portion of it. The distorted results produced by such a view of the contracts will not, we feel confident, influence the judgment of the Commission as to the usefulness of the facts presented in the data as a whole.

With respect to the proper prices for placing ballast no testimony has been presented by the In-

terveners and no issue has therefore been definitely raised. They merely seek the application of the maximum Memorandum 733 prices, but their demands are unsupported by any proof.

We confidently believe that if a really sincere and thorough effort were made to eliminate erroneous and improper costs from the carriers' cost data, and to eliminate charges after the beginning of commercial operation, the costs thereby developed even on the unrepresentative projects would closely approximate the Bureau's prices for Account 12.

IV

AN ANALYSIS OF THE PROJECTS AND THE COSTS SHOWS THAT THE DATA SUBMITTED BY THE INTERVENERS DO NOT FURNISH A RELIABLE AND TRUSTWORTHY GUIDE TO REPRODUCTION COSTS

The discussion under this heading will treat generally the reported costs of the individual projects and such other information regarding the manner of construction as is important in determining whether or not the project is representative of theoretical reproduction.

During the course of the hearing the Interveners offered witnesses from various eastern and southern carriers to present data on all projects constructed since 1900 for which they could secure the costs. There were 149 projects of which 104 were in the Eastern and 45 in the Southern group. Most of the witnesses brought to the hearing such records as were available in support of the costs which they

reported, but in only a few instances were the original books of entry furnished. The Bureau was confronted with the problem of analyzing the mass of details supporting the reported costs without delaying the progress of the proceeding and without disrupting its other work. The verification of Account 12 charges was complicated by the fact that tracklaying items frequently were buried in details relating to other accounts and other projects. The preferable way would have been to have had a force of engineers and accountants analyze these details and present the results. This procedure was out of the question, however, due to the lack of assistance available and the limitations of time.

To illustrate the magnitude of such a task; an accountant for the Bureau assisted by a carrier representative who was familiar with the data worked approximately three months in breaking down the costs set out in four New York Central (West) projects. The Bureau's engineers and accountants also made a study of 17 New York Central (East) projects, the results of which were introduced into the record. Mr. Saunders, witness for the Bureau, also testified generally with respect to the carriers' cost data and the type of projects presented. Due to the inability to pursue the more preferable method of making a thorough analysis of these costs, it was decided to make a brief examination of the underlying details and ask questions sufficient to bring out the important features, such as the

manner in which the work was prosecuted and costs prepared.

Another and better reason for not devoting considerable time to an analysis of these costs was that a cursory examination disclosed that generally the data were not useful in estimating reproduction costs. The majority of the projects are not representative of theoretical reproduction, many being line revisions, additional tracks, and small jobs. Moreover, the Bureau can not agree that the greater part of the sums reported are actual costs or approximate actual costs. It can not subscribe to the practice followed of making material adjustments to the recorded costs by means of estimates, prorations and calculations; and then call the results actual costs. Neither can the Bureau approve or sanction the method which was necessarily followed by most carriers in redistributing the book costs as between Account 12 and other accounts. Since most of the projects were constructed approximately 15 to 25 years ago and the costs recorded under accounting systems different from those now in use, it is largely a matter of judgment to interpret, redistribute and transfer the costs recorded in the accounts at that time, with only meagre records as guides. To a large extent the costs now reported represent merely the opinions of interested parties as to what the actual costs were.

The Interveners (Br. p. 43) suggest in effect that the Bureau should compile a tabulation of the

errors existing in the costs as presented and advise as to the proper way to estimate and pro rate unrecorded or confused charges. But the fact is that all the costs can not be verified, at least not from the data submitted at the hearing. In many cases the errors are cumulative and it would be wholly impossible to make accurate deductions with a view to obtaining as a result the proper actual cost.

Many of the projects presented and used by the Interveners in developing the pricing schedule have been presented various times since 1916 to the Bureau and in formal hearings to the Commission in support of Formula F. The Presidents' Conference Committee or the carrier has each time vouched for the correctness of the costs. There have been at least three widely varying sets of costs reported for many of these projects, the variations being as great as 34 per cent. (Ex. 416.) In each instance it was represented that the costs were correctly adjusted in accordance with the best judgment of the carrier and the Commission was expected to accept them as a basis for determining proper prices to apply to tracklaying and surfacing. (Tr. p. 6403.) There is no assurance now that this latest revision is any more correct than the previous ones or that a subsequent analysis of the same jobs will not develop that the supposedly correct total costs now reported require further revision.

Not only is it true that the costs of these projects as formerly presented by the Interveners in support of Formula F have been greatly altered, but many jobs offered to the Commission as good cost data are not now reported or relied upon. The explanation is that an investigation proved that the costs were not accurate. This is true as to all of the projects on the Pennsylvania Lines (West). (Tr. p. 2407.) Even several of the projects presented at this very hearing and formerly used to support Formula F are now discarded. The fact that these costs have now been revised is ample justification of the Bureau's previous criticism of their accuracy, as heretofore presented. The past history of many of these costs is such as to give rise to a doubt as to their reliability.

It is manifestly impossible to make an exhaustive analysis of these costs. The Interveners did not offer affirmative support of the details making up these exhibits, contenting themselves merely with statements that the charges were taken from their records or were estimated; and cross-examination, of course, could not scrutinize every detail without being prolonged interminably. Many times indeed, cross-examination was thwarted by the entire ignorance of the witness as to important details of the study which he was presenting. In a large number of cases nothing whatever was known about the manner in which the track was constructed or about conditions surrounding the construction.

Not infrequently the information as to details of the work came from some correspondence file or memoranda which were not presented at the hearing and about which the witness had only a hazy recollection.

It was extremely difficult for the Bureau to develop exact information as to the contents of the carriers' cost statements. Time books were produced in a few instances, but in many cases detailed information was lacking. This record strikingly illustrates the difficulty of obtaining accurate actual costs and justifies the position taken by the Bureau that its field accountants have been unable to secure such costs in the past. The futility of such an effort is illustrated by an attempt of a bureau accountant to obtain accurate costs from the Louisville and Nashville records.

Before discussing the data presented by the carriers, it is necessary briefly to touch upon the nature of the charges which are included under Account 12, Tracklaying and Surfacing.

Scope of Account 12

Under the 1914 Classification of Accounts, Account 12, Tracklaying and Surfacing, includes the expense of transporting track material from the material yard to the point of installation and the expense of unloading and distributing such material at the site of the work. It does not include the expenses incurred at the material yard or storage point, such as unloading the material from the cars,

moving or sorting and reloading it on the work train for the final distribution, which are properly chargeable to the material accounts 8, 9, and 10. Temporary storage piles should be regarded, for the purpose of determining costs to be used for reproduction estimates, in the same light as regular material yards, as the Bureau in estimating cost of reproduction new in all instances includes in the material accounts separate amounts for material yard handling. Account 12 also includes the cost of assembling the ties, rail, and other track material into a completed track, and in addition the cost of applying a running surface, the cost of spreading and surfacing ballast, and all maintenance prior to the beginning of operation. The other costs in connection with the ballast such as the producing, hauling, and unloading are properly chargeable to Account 11.

One difficulty in ascertaining the correct costs for tracklaying and surfacing under the 1914 classification as above outlined is due to the fact that there were changes in the accounting systems during the pricing period. In 1897 the Commission issued a classification of construction expenses, but under the law which then existed it could not enforce compliance therewith. Effective July 1, 1907, the first mandatory classification was issued. Following the issuance of the 1907 Classification, it was some time before the accounts of the various carriers throughout the country were changed in accord therewith. Their accounting had been per-

fects in accordance with systems of their own and the change could not be made overnight. The Bureau has no information as to when the 1907 classification was finally installed by the various carriers. But the Commission's power to require the carriers to set up their accounts in accordance with the classification was not finally passed upon by the courts until some years later. Effective July 1, 1914, the Classification of Investment in Road and Equipment was issued and the cost of reproduction estimates for the various accounts are set up by the Bureau in accordance with that classification. It was not until the issuance of the 1914 classification that there was a clear separation in the carriers' accounts between Account 12 and the other accounts, particularly Accounts 8, 9, 10, and 11. Prior to 1914, the accounts were kept as best suited the convenience or the whims of the individual carriers and there was no uniformity.

Even since the 1914 classification it has been difficult to separate accurately the labor charges between Account 12 and Accounts 8, 9, 10, and 11 for the reason that from a practical standpoint, there is not a natural division of labor as between these accounts. For instance, the same men who unload the ballast at the same time and as a part of the same operation spread it. Part of the operation is chargeable as unloading ballast to Account 11 and as spreading to Account 12. In the same manner, particularly on small jobs, the men unloading the material from the cars at a storage point load

it into the cars to be carried to the point of use and there unload it. Without access to the original time books, any correct redistribution of these charges in accordance with the present classification of accounts seems impossible; and even though time books are available, it has been found that the descriptions of the work performed are not in sufficient detail to permit an accurate redistribution without exercise of judgment. These difficulties were encountered by the Bureau accountants immediately subsequent to 1914 when the Bureau attempted to ascertain the correct costs for this account. The same infirmities exist in the cost data now presented.

No item of profit to the carriers is a permissible charge to the investment account. In the 1914 Classification, page 10, costs are defined as "actual money cost to the carrier." Charges for such items as transportation of men and materials and rental of equipment should be entered in the investment accounts at the actual costs to the carrier rather than at a tariff rate or a regular per diem rate for equipment used in commercial service.

Account 12 is an investment account applicable to construction as distinguished from operation. The Commission's Classification does not provide for charging to the investment account expenses incurred after the beginning of transportation service on a particular line, except the cost of installing additional material to complete the construction. This is amply borne out by the practice of the Com-

mission through its Bureau of Accounts and is clearly stated in Case No. 57 of its "Interpretation of Accounting Classifications," as follows:

Q. When is a road under construction required to commence keeping accounts for operating revenues and operating expenses?

A. Accounts of operating revenues and operating expenses shall be kept as soon as the road begins the operation of transportation service trains.

As it is so well established that maintenance expenditures can not properly be made to the investment account after the beginning of commercial operation, any discussion of this point would seem superfluous. The Interveners contend, however, that even though the line is under commercial operation, charges such as resurfacing and relining are proper construction charges and that the construction accounts should not be closed for such entries until the line has been brought up to the maximum permissible speed which it finally attains. This interpretation is in conflict with the provisions of the classification. The maintenance work required in resurfacing and relining is a necessary expenditure for the safe operation of the road. Such expenditures made subsequent to the date of commercial operation are improper to Account 12.

Before taking up the general defects which have been disclosed in the costs for the various projects presented by the carriers, it may be helpful to suggest our conception of the fundamental requisites

of cost data useful in estimating costs for theoretical reproduction.

Requisites of good cost data

In the first place the tracklaying and surfacing projects must be in some degree representative of conditions which would be encountered in reproduction. Reasonable progress in the prosecution of the work should be made, since reproduction contemplates economical construction with no undue delays. In the opinion of the Interveners' expert witness Kittredge, tracklaying under ideal conditions could be performed economically and efficiently at the rate of about one mile a day. (Tr. p. 6187.) Sufficient funds should be on hand to insure the uninterrupted progress of the work. Likewise, in reproduction, delays incident to the acquisition of land, or occasioned by litigation on that account are not contemplated. A construction project to be useful as cost data should comprise a reasonable amount of mileage, otherwise the overhead costs and the expense of getting ready for the work may be disproportionately heavy. Reproduction does not involve tracklaying and surfacing on lines already under revenue operation, and to the extent that carriers' projects are affected by the presence of operating traffic they are dissimilar to reproduction conditions. Likewise, no change of grade or revision of alignment would be necessary in reproducing existing tracks, so that it can not be said that data involving work of this nature are representative of reproduction conditions. In

reproduction the work would not be undertaken in piecemeal fashion which involves connections with operated tracks at frequent intervals, with the new line being put into service in small sections. Finally, no duplication of work should be found on the project, since in reproduction no duplication would arise, because there is available the benefit of past experience in constructing the particular track under consideration.

In addition to having a project which, in the nature of the work, is representative of reproduction conditions, there must also be had a record of the costs which is accurate and reliable. There must have been accurate and complete records made during the construction, compiled by a competent person with the incentive to be accurate as to the distribution of the charges to various accounts. We have already noted that during the pricing period there was no compulsion on the carriers to be meticulous in making a correct distribution of costs to the various accounts. All that was necessary from their viewpoint was that the total expense be charged *somewhere* in the construction accounts.

In presenting cost data there should be available *original records* such as time books and work-train reports which can be used to check the distribution to the various accounts. The details of the work performed should be noted on the original reports, if a check of the distribution is to be made possible. In view of the fact that practically all of the work considered in arriving at prices for reproduction

was performed prior to the inauguration of the present classification of accounts, it is absolutely essential that the description of the work done be recorded in sufficient detail to permit an adjustment from the manner in which the charges were originally entered to conform to the present classification under which the pricing is being done. Again, the cost data to be considered reliable must be substantially *complete*. If estimates must be resorted to, the compilation loses its character as cost data and becomes more or less the opinion of the individuals who present the information rather than a correct transcript of actual performance. Finally, the witness who presents the cost data should be sufficiently familiar with the accounting practice of the carrier to describe in detail the manner in which the records were kept and should also be familiar with the actual performance of the work, the cost of which he is presenting.

Nature of records underlying carriers' exhibits

It now becomes pertinent to examine the basis of the exhibits presented in this case by the carriers, with a view to determining the reliance which may be placed upon their records. Generally speaking the carriers' records provided an insufficient basis to make the distributions which were necessary and are not sufficiently complete to enable the Bureau representatives to test the accuracy of the reported costs.

Original records were available for some of the projects, but on the greater proportion such origi-

nal documents as time books, work-train reports, and vouchers were either not available or were not consulted in preparing the exhibits. The carriers' ledgers were examined in some cases but the entries thereon were either lump sums which would permit no breakdown or were items which bore no description sufficient to identify the particular work covered by the charge.

Most of the work covered by these exhibits was performed prior to the adoption of the 1914 Classification of Accounts. What records were available had not been kept in accordance with that classification and in a very large number of cases no clear separation had been made between the elements which are now covered in Account 12 and items which, under the present classification, are proper charges to the material accounts. It was, therefore, necessary for the carriers in preparing their exhibits to *interpret* the entries in the light of the 1914 classification. Some items were transplanted bodily from various accounts to Account 12 because the description of the item seemed to suggest that the work done belonged to that account. Likewise, it was found in some instances that work charged to the "Track" account on the carriers' records is not embraced under Account 12 as now in effect and an adjustment had to be made for this reason.

Most of the carriers felt that the amounts recorded on their books for construction work did not cover all items of expense incurred, and they

attempted to complete the costs by the addition of estimated amounts which form a substantial part of the total costs reported. There is generally no evidence to show that the specific item of cost which, in the opinion of the man who adjusted these costs at a recent date, was omitted, actually was incurred on the work, nor is there any positive evidence that the particular item which can not now be identified is not buried in some lump sum which defies analysis. It is entirely possible that an element of cost which, at the present time, would be deemed unavoidable, was not incurred during the construction in that precise way but was taken care of by some different means. To illustrate, in original construction, track material might be distributed largely by teams and charges therefor included in the records. The analyst, 20 years later, finding no charges or very minor charges in the recorded costs for work-train service, estimates that some work-train service must have been required and adds large estimated amounts to cover this expense.

This is cited merely as showing the inherent weakness of attempting to supplement recorded costs by estimates when little is known either of the actual conditions surrounding the construction or the manner in which charges were recorded. With a very few exceptions the witnesses who presented the exhibits and testified regarding the items contained therein were not connected with the

original construction and in most cases were unable to supply definite details of the manner in which the work was performed. Some of them had consulted certain correspondence files, while others had no more information than what appears in the exhibits themselves. The inability of the witnesses to testify as to the details of the construction work seriously lessens the value of their testimony and casts doubt upon their qualifications to interpret and adjust the accounting records.

In view of the condition in which the carriers' accounts were for the most part kept, prior to 1914, a thorough analysis requires that an examination be made of various other accounts such as the rail, tie, track material and ballast accounts to determine the completeness of the charges *to these accounts* so that there might not be any room for the suspicion that Account 12 may include charges proper to the material. This, however, was not done in the vast majority of cases and several of the witnesses stated specifically that they were not the least bit interested in this matter. The attitude displayed in this regard does not afford a substantial guarantee that their work may be viewed with the highest confidence as being complete and thorough.

General nature of adjustments made in carriers' data

The carriers reached their so-called proper Account 12 costs by deductions from and additions to the book costs that were generally estimates and prorations dependent upon the idea of the engineer

of the particular carrier upon whose lines the job was located. It is stated that these calculations of capital charges were known to be incurred but not found in the capital account. The amount of such charges of necessity in conjectural, which detracts from the reliance to be placed upon the whole as actual total costs. We shall discuss first in a general way the nature of the *added* items. These fall into four general classes; estimates, calculations, prorations, and transfers from other accounts.

With respect to a number of items supposed to have been incurred in the construction there was no information upon which a calculation could be based so that pure estimates were necessary. These in general are based either upon the judgment of the witness who compiled the exhibit; on the experience of the particular carrier or other carriers on different jobs which were not ordinarily proven to be comparable to the project under consideration; or finally on charges made for similar items in the regular maintenance work of the carrier. An amount derived in any of these ways is, of course, nothing more than hit or miss, and the total cost in which these amounts are reflected must be questioned in the same degree as the items composing it are questionable.

Other omitted items of expense have been calculated from fragmentary data in possession of the carrier. For example, on numerous projects the cost of rental of equipment was determined in the

following manner. The total recorded wages of the work-train crews were divided by the daily wages of the crews and the result denominated the number of days during which the work-train was in service. Rental rates based in most cases either on a charge made by the railroad company for outside rental or on the prevailing per diem rate for commercial service were then applied to the number of days calculated. In very few cases could the witness explain what elements were included in the rental rate charged. Frequently it clearly appeared that an element of profit to the carrier was comprehended therein. The total wages paid to the train crews do not reflect the actual time spent in the operation of trains but rather reflect the time for which the men had to be paid whether they were working or not. The calculation thus made results in the maximum number of days for which it would have been possible to operate a train for the amount of wages paid the train crews.

In some cases, the cost of transportation of men has been calculated by applying the full tariff rate to an estimated number of men transported. This involves both the use of a guess and the application of an improper rate and in this respect violates the Classification of Accounts which states that "costs shall be actual money costs to the carrier," inasmuch as the full tariff rate is presumed to include profit.

A number of *prorated* items are found throughout the majority of the exhibits. This was neces-

sary in an attempt to allocate certain overhead items charged on the books or estimated in a lump sum, to the various accounts for which the work was performed. In practically all cases the ratio used between the various accounts is either an estimate made by the witness or is an arbitrary division made in the absence of any reliable grounds upon which to found a better estimate.

The remaining major type of additions to the recorded costs of the tracklaying account is the transfers of amounts from various other accounts to Account 12, either for the reason that the description of the item charged to the other account suggests that it might be more proper to Account 12 or because the witness assumed that some charge was omitted from the recorded costs and should be supplied before the study was presented. This practice involves an interpretation by the witness presenting the study of indefinite items entered on the books many years ago by an entirely different person or set of persons. Examples of the series of interpretations to which some of these jobs have been subjected may be found in the projects submitted by the New York Central Lines (East), the Louisville & Nashville, and the Pennsylvania. In the case of many of these transfers no reason is apparent why the person who made the original allocation at the time of construction was not better informed as to the proper manner of charging that item than the man who took it upon himself to make

the adjustment a number of years later with little or no information as to what actually took place on the construction. Some of these transfers have been made after one previous readjustment in accordance with the 1914 Classification.

One other comment may be made with respect to the readjustments made in the recorded costs. In not a few instances the description of the work done as set out in the exhibits differs from the description found in the original records. Instances of this kind are certain charges for handling material in exhibits presented by the Pennsylvania Railroad and by the Pittsburgh & Shawmut Railway. Whatever the purpose of this change in description may have been the effect undoubtedly is to remove any question that the item may not be entirely proper to Account 12. When a practice such as this comes to light it naturally discredits, in some measure, all of the data presented by such parties.

Another class of adjustments has been made in the recorded costs in the form of *deductions* to take care of costs known to be improper to Account 12 which were charged on the books to the "Track" account. In general, two different bases are used to make these deductions; one the carrier's own estimates based on data which it was able to develop, and the other a deduction based on the prices applied by the Bureau in estimating its reproduction cost for the items in question. As a rule the

deductions cover handling charges for materials or ballast which should properly be found in Accounts 8, 9, 10, or 11.

Adjustments have been made in many exhibits to deduct the labor cost of unloading ballast, which had been recorded to the tracklaying account. Generally the amount deducted by the carriers has been more or less arbitrary, not being founded on any study of cost data, and being made without any definite information in most cases as to the manner in which the ballast was unloaded; that is, for example, whether it was shoveled over the sides of gondola cars or was unloaded from automatic dump cars. Unloading ballast by hand is, of course, several times as expensive as when unloaded from automatic dump cars. Information on this point, of course, is essential in order to arrive at an amount which approximates the actual cost. Adjustments have also been made in many exhibits to take care of the item of work-train service hauling or unloading ballast. This estimate is also subject to the same infirmity, and in addition little was known in most cases as to the exact length of haul which the work-train had to perform. Without accurate information on these points the result of such estimates must be regarded very lightly.

With respect to deductions for the expense of handling material which should properly be charged to the material accounts, the carriers' estimates have been generally arbitrary for the reason

that there was very little data upon which to found an accurate estimate. These approximations frequently take the form of a division of 50 per cent of the handling charges to Account 12 and 50 per cent to the material account. An example of this may be found in the practice of the New York Central Lines (East). While this is probably as close as the carriers could get to the fact, it still represents nothing more than a guess.

Many of the carriers instead of attempting to make an estimate from their own data adopted for the purpose of making deductions the handling charges used by the Bureau in its reproduction estimates. The Bureau price for labor and work-train service unloading ballast contemplates the most efficient mechanical unloading, which would consume a minimum of time and expense. Such a method of doing the work was not adopted on all of the jobs to which such estimates were applied and the result will, therefore, be necessarily inaccurate in those cases. Likewise, with regard to the deductions for the cost of handling material at material yards, which should not remain in Account 12, the Bureau prices have frequently been used as a basis for an estimate. The Bureau prices, of course, assume an efficient and economical method of prosecuting the work with the most modern appliances available. Frequently the conditions existing on the various jobs were very dissimilar to what would be assumed in theoretical reproduction. This also

must be remembered, that the Bureau material yard prices are based on the handling of *large quantities* of material, probably in most cases much greater than the quantities of material used on the small project reported by the carrier to which the Bureau prices were applied. Because of the large quantities involved in the Bureau prices, economy in various items of overhead expense could be practiced and the resulting unit prices applied to the handling of each kind of material would be correspondingly lower. It requires no argument to make it plain that when the deductions applied are the amounts which would be incurred for the various items under more favorable conditions, the resulting remainder still charged to Account 12 is likely to be considerably higher than it would be if actual costs were applied in the deductions. The result of this practice is nowhere better illustrated than in the case of certain Pennsylvania projects where, *with contract prices actually paid available*, a deduction for placing turnouts was made on the basis of the Bureau prices, even though the Bureau prices were only *40 per cent* of the actual price paid to the contractor. In one instance the result of this computation is to inflate the price for tracklaying and surfacing about \$250 per mile.

When the matter of *additions* to the recorded cost was under consideration, however, in no case which now comes to mind were the carriers *compelled* to resort to the use of Bureau prices.

Other general defects in the reported costs

The Interveners admittedly include in the costs reported for many of the projects charges which were incurred after the road was opened for operation on the theory that expenditures during the first few months "after opening at restricted speed as a result of which the permissible speed was increased" are proper charges to the capital account. We have already pointed out that this practice is improper. The inclusion of maintenance charges after the beginning of operation is not confined to those instances where it is contended that the speed was increased, but occurs on many other projects where no such excuse is applicable.

We have already mentioned that due to the changed systems of accounting, Account 12 prior to 1914 contains in many instances charges for material yard handling and for unloading ballast which properly belong to other accounts. The description of the charges indicate that the same conditions exist in the reported costs. Many of the exhibits contain labor items for loading material which obviously are proper charges to the material accounts. This is likewise true of charges for unloading ballast which are proper to Account 11.

The Interveners contend that on many projects material yards or store yards were not established, but that the material came direct from the division storehouse or from the manufacturer to the point of use where it was unloaded and used. In many instances the charges indicate that there was a tem-

porary storage of at least a part of the materials at some central point until needed in construction. For example, the handling and rehandling of ties at temporary storage piles is equivalent to material-yard expense. Assuming, however, that all the material came direct from the manufacturer to the point of use and was there unloaded and used, a comparison between the theoretical reproduction prices and the actual cost of such work is inaccurate, as the Bureau in all instances adds an amount for material-yard charges in the material accounts. The better way would be to compare the aggregate reproduction estimates for accounts 8 to 12, inclusive, with the aggregate actual cost for the same accounts. Either this should be done or the charges to accounts 8, 9, 10, and 11 should be carefully analyzed to determine whether or not Account 12 is burdened with costs which properly may belong to the other accounts.

The above and other defects in the Cost Studies will be commented upon in discussing the costs for the individual projects. The discussion of the carriers' exhibits will cover only in part the errors and inaccuracies which exist therein and does not purport to be a complete summary of such items. Reference will be made only to the more outstanding examples. We shall limit our discussion to those projects used by the Interveners' in the development of their pricing Schedule and these will be taken up in the order presented.

NEW YORK CENTRAL LINES (EAST)

General Comment

Witness Krake presented studies of the cost of tracklaying and surfacing on 30 projects on the New York Central Lines (East).

In 1919 the valuation department of this carrier attempted to analyze the costs of the various tracklaying and surfacing projects constructed on its lines subsequent to 1900. Most of the construction work covered in these studies had been performed prior to the 1914 Classification of Accounts and the charges had been recorded under a system of accounts which differed in essential respects from the 1914 Classification. The carrier, therefore, had to adjust the costs as recorded in order that they might conform to the present classification. Complete records of original entry such as original time books were not available in 1919 to the accountants, and reliance was placed chiefly upon what are known as the monthly "betterment sheets," which show the distribution of the total charges for each month. In making the 1919 analysis, the valuation department was forced to resort to a great many interpretations of the charges on the betterment sheets.

Under the former accounting practice of the carrier all costs of handling track material to the site of the work were charged to the material accounts. As there were no definite details of the separate costs for each part of the handling, it was necessary to estimate the division between handling charges

which are proper to Account 12 under the present classification and those which should remain in the material accounts. Likewise, items described on the betterment sheets as "ballasting" sometimes included the cost of unloading, which, under the present Classification, should be charged to Account 11, Ballast, making necessary a deduction to arrive at the proper account 12 costs. These are typical illustrations of the many adjustments found necessary in 1919 revision.

The present exhibits were compiled in 1925 and were based almost entirely upon the 1919 analysis. Further adjustments were made as the result of information contained in certain correspondence files and such other papers as could be located. (Tr. p. 5235.) Thus it would appear that the carrier did not consider its 1919 analysis accurate. Witness Krake, who prepared the 1925 studies, was not connected with the 1919 investigation and could not testify first-hand as to the manner in which it was prepared. He could not be sure that the descriptions of charges shown in the betterment sheets were transferred to the accounting analysis without changes. He was not even familiar enough with the policies of the accounting department of the New York Central to be able to say when that carrier adopted the 1914 classification of accounts. (Tr. p. 5796.) Yet he has no hesitation in presenting himself as an authority in interpreting the records of that department over an extended period.

In certain cases, charges which read "loading and unloading" material were divided, 50 per cent to represent the unloading, and this amount was transferred to Account 12. This division is, of course, wholly arbitrary and may have no relation to the actual expense. (Tr. p. 5285.) Apparently all charges described as "handling material" have been included in the exhibit under Account 12 on the assumption that this handling all took place on the site of the work. On a number of the projects, however, the material was stored more or less temporarily in piles near the site of the work and there is no question but that certain of these handling charges should properly be made to the material accounts. In other cases the witness claimed that the expense of loading is included in the price of the material and, therefore, would not show separately as a loading charge. If this is a fact it can, however, apply only to those cases where material came through the division store yard. But in those cases where the carrier has dispensed with a material yard on the project and transported materials direct to the point of use from the division store house and from the manufacturer, the result is an economy in the material accounts to the disadvantage of account 12. In order that a proper comparison be made, the aggregate reproduction costs for accounts 8, 9, 10 and 12 should be contrasted with the aggregate actual costs for the same accounts.

No charges had been made under the old accounting system to capital account for rental of equipment or use of tools, and amounts to cover these items have been estimated and included in the total costs in 29 of the 30 exhibits. In estimating rental of equipment, the total amount charged for work-train-crew wages was divided by the total wages per hour, and as a 10-hour day was assumed this result was divided by 10 to obtain the assumed number of engine days. This computation ignores the fact that the amount paid for wages of work-train crews may not represent the actual time spent in the operation of work trains on tracklaying work and that the result represents the maximum number of work-train hours possible for the amount of wages paid the train crews. In a number of cases where it is apparent that Account 12 has been burdened with too great a proportion of work-train crew wages this method, of course, results in the same improper allocation of equipment rental.

No record was available for most jobs of the number of work-train cars and the estimated number used on different projects varied from 4 to 8. The rental rate applied was the carrier's 1914 rate charged by the operating department for addition and betterment work. There is no evidence that this is the rate which should be correctly applied to all of the projects presented. Most exhibits include a substantial charge for rental of a derrick car for the same number of days as estimated for engine rental. This computation is based on the assump-

tion that a derrick car was constantly with the work train, but evidence to support this assumption is meagre indeed. On one exhibit the only evidence of the presence of the derrick in the work train was a charge of about \$10 for repairing a derrick.

In estimating the cost of track tools, 1.765 per cent of the total labor cost was used. This percentage was developed on the New York Central Lines (West) as the ratio between the total expense for small track tools and the total track labor charges during the period 1910 to 1914. (Tr. p. 1399.) It is needless to say, of course, that this may or may not represent the actual cost of this item on the projects presented by the Lines East.

An adjustment was made for the cost of placing bridge ties by transferring these items from account 8 where they were originally charged into Account 12. (Tr. p. 5236.) Other large adjustments have been made in the recorded costs to cover the expense of tracks constructed at the same time as those reported in the exhibits but for some reason not included in the study. Adjustments were also made in the recorded costs to deduct expenses for maintenance or other work on existing operated tracks performed at the same time by the same forces who constructed the tracks included in the study. In most cases it is impossible for the Bureau to check the adequacy of the amounts deducted.

That more useful results were not obtained by the witness is due to the inherent insufficiency of the accounting records. Complete information could

not be secured. We do not question Mr. Krake's sincerity in attempting to interpret the old records as well as he could, but the fact remains that his total reported costs are the result of interpretations and estimates which can not be checked against the facts.

The Bureau understood that the records of this carrier were about as complete as any obtainable, and in the effort to ascertain what the actual costs were, made an analysis, through its own employees, of a large number of their jobs. The result was disappointing, however, because in no case were full and complete costs obtainable from the records. This investigation demonstrated that no results could be secured without resorting to interpretation of charges as entered on the records, and to numerous adjustments on an estimated basis. This analysis also showed beyond question that in many instances the costs of material-yard handling and unloading ballast were buried in the account 12 costs.

The 30 exhibits presented by this carrier include work of all kinds; several yard projects, some revision and line change work, a few entirely new lines and a considerable amount of additional track work, the latter amounting to over one-half of the total mileage. The additional track and line change work involved in practically all cases a large number of connections with an operated track. Inasmuch as the mileage of the individual projects is generally small the fact that a large number of con-

nections are included inevitably has the effect of enhancing the cost per mile and makes the result unrepresentative of what might be expected in reproduction.

One other significant fact respecting the nature of the work is that the average rate of progress in tracklaying and surfacing was extremely slow. The rate of progress for completed track ranged from a quarter of a mile to two and three-quarter miles per month and on 16 of the jobs the rate was less than one mile per month. This fact is most eloquent and of itself casts very serious doubt upon the usefulness of many of these projects as a source of reliable cost data.

It should be emphasized that the costs as finally presented are the result of several interpretations of accounts by men who were not familiar with each other's work or in most cases with the actual construction. There were numerous adjustments in all the accounts and to the totals thus adjusted, charges are added for estimated items. Nothing better can be said of the resulting study as a whole than that it is an estimate and weight can be given to it only as such.

A brief comment will be made on a number of the individual projects presented by this carrier in order to point out specifically some of the fundamental objections involved. For the reason that most of these projects are not considered comparable to theoretical reproduction it will not be necessary to discuss the costs in detail.

Exhibit 222, Brewster Yard.—This project, a yard with a total mileage of 6.6, occupied a construction period from December, 1909, to February, 1912. Obviously, due to this rate of progress, the project is not comparable to reproduction because it is unquestionably true that increased charges are occasioned by delays. As an example of the adjustments which have been made in the recorded costs of all jobs, it is noticed that the ledger costs charged to Account 12 for this project were \$16,135.39. As the result of the adjustments made during the 1919 analysis, the recorded cost to Account 12 was increased to \$19,433.49. This amount was reduced by the witness in 1925 to \$12,400, the remainder of \$7,033.13 being costs not properly chargeable to the tracks reported in the exhibit. The list of transfers from other accounts appearing on sheets 3 and 4 of the exhibit shows, from the description of the items, that the work in many cases may be questionable as proper to Account 12.

Exhibit 223, Beaver Dam to Corning.—Only 11 miles of second track are comprised in this exhibit. The total costs reported have gone through various adjustments, \$6,398.58 being added to Account 12 in 1919, and \$10.60 deducted. Most of the items added are taken from Account 11 and are described as "ballasting track." This amount was apparently transferred because of that description, but the fact that it was originally charged to Account 11 seems persuasive that at least some Account 11 charges are included. The later investigation re-

sulted in a deduction of \$1,567.72, but most of the items for ballasting track were permitted to remain in the costs.

Exhibit 224, Belle Isle Yard.—This is a small yard and the tracks were opened for operation at various times, some of them being operated 7 months before the remainder. (Ex. 445.) A sketch of this project incorporated in Exhibit 446 shows that certain tracks were *removed* during the construction period, but in spite of this fact no deductions were made for operating expenses. On most of the other exhibits where work of this nature was in progress simultaneously with the new work, operating charges show as deductions.

This exhibit illustrates the fact that material yard charges are included in Account 12 where definite information could be obtained. The exhibit shows that material was shipped in revenue cars to the site of the work and there *unloaded and stored*. Exhibit 431, which is the Bureau's breakdown of the costs for this project, shows charges described as "handling." Obviously some of this handling was the unloading, piling, and loading material at these storage piles and the charge should be made to the material rather than to Account 12. This situation presents an emphatic contradiction of Mr. Krake's attempted explanation of the frequent "handling" charges in his exhibits.

The estimated costs for rental of equipment include a charge for a derrick at the rate of \$5 per day for the full number of days estimated as a

basis for engine rental. There does not appear to be any evidence in the accounting records that a derrick was used *every day* and doubt must be entertained as to the correctness of this charge. The exhibit shows that the calculated number of work-train days is 97.4. Inasmuch as this yard contains only about 14 miles of all tracks, this calculation develops that it required an average of 7 days' work-train service to distribute each mile of track material.

Exhibit 225-A, Brockport to Albion.—For construction purposes this second-track line was divided into two sections, one 4.5 miles in length and the other 5.02 miles, and each was placed in operation at a different date. This feature necessitated the making of several connections with the operated track at an expense which undoubtedly is not representative of what would be met in reproduction. This piecemeal construction, so unrepresentative of reproduction, merits no extended discussion.

Exhibit 227, Churchville to East Buffalo.—This construction, comprising 39.6 miles of second track and passing track, was built in comparatively short stretches as fast as the grading was completed. Commercial operation over the whole line began at one time, as far as can be learned, although some of the track may have been used for storage purposes and sidings prior to the date the entire project was placed in service. (Tr. p. 5341.)

This case illustrates the practice of adding substantial amounts based upon very little evidence. For instance, while the calculated rental of a derrick during the whole period of construction amounting to \$2,030 was included, the only record to show that a derrick was on the job was a charge of \$10.54 for repairs. (Tr. p. 5346.) The witness assumed that the derrick was used for unloading material, but assumed it would also be possible to use it for loading material. (Tr. p. 5345.) A former cost report by the carrier to the Bureau stated that material on this job was unloaded by hand and this would not indicate that it was the practice to include a derrick in the work train. The witness stated, however, that a recent investigation developed that a derrick was used, but the only information he could point to in substantiation of his statement was this one charge for repairing the derrick. (Tr. p. 5350.) His statement amounts to this, therefore, that on the basis of a \$10.54 charge for repairing a derrick, the sum of \$2,030 is included in the exhibit for the rental of a derrick. A more flimsy basis for any estimate could scarcely be imagined.

Throughout most of his exhibits, witness Krake assumed that the charges for "ballasting" on the monthly betterment statements referred only to placing ballast, Account 12, and did not include any labor for unloading ballast, Account 11. A number of items described as "ballasting" are included in this exhibit. The cost of work train serv-

ice hauling ballast appears charged to Account 11 and there should be corresponding labor costs for unloading at the same time, but there is no labor cost for unloading ballast shown as charged to that account. (Tr. p. 5368.) He assumed that it would be light because the ballast was ploughed off flat cars, and this would seem to be an admission that Account 12 does include some charge for unloading ballast, which is, of course, wholly improper.

He based his allocation of the entire cost of ballasting to Account 12 upon the assumption that the ballast was unloaded by a plow from flat cars and that the work-train crew expense included the extra labor necessary to operate the unloading machinery. (Tr. pp. 5373-5374.) This assumption proved to be erroneous, however, as he discovered upon inspection of the betterment sheets, where it was found that the wages paid the work-train crew were the same as paid the ballast-train crews.

Exhibit 228, Cranes Village Change of Line.—This exhibit reports the cost of line-revision work of a total track mileage of 3.73 miles, on the four-track main line of the New York Central, where the traffic was extremely heavy. The sketch reproduced herein on page 6 graphically illustrates the manner in which this work must have been interfered with by operation on the old tracks. The new line, in addition to being connected with the operated track at both ends, crosses the old tracks near the middle. At one point the new alignment lies

partly across the old roadbed for a distance of about one-third of a mile. In addition to the eight connections made with the operated track at the ends, there was inevitably tremendous interference with construction work at other points on the line.

As this is one of the few projects where the claim is made that it was opened for operation at a high speed, it may be profitable to consider the facts with regard to the first operation. Tracks 1 and 2, high-speed passenger tracks, were placed in operation May 7, 1907, at a speed not to exceed 25 miles per hour, which was increased to 35 miles on May 28, and to 50 miles on June 5, 1907. Subsequently this speed was reduced to 25 miles per hour and on August 1, 1907, restored to the 50-mile limit. Tracks 3 and 4, freight tracks, were first operated May 20, 1907, at a speed not to exceed 25 miles per hour. (Ex. 445.)

Some light on the manner in which these tracks were thrown open for operation is afforded by a letter found in Exhibit 445, dated three weeks subsequent to the time tracks Nos. 1 and 2 were placed in service. Apparently a force of 70 men was employed in attempting to keep these tracks in shape for 35 miles an hour even after they had been operated for three weeks, or one man every 70 feet of double track line. In spite of this intensive effort to maintain high speed it was found necessary at a later date to reduce the speed to 25 miles per hour. We believe this is a typical example of the few so-called high speed tracks included in this presenta-

tion. It is a short cut-off between two pieces of high speed main line where fast passenger schedules must be maintained and where operating necessities overcame any considerations of economical construction. In spite of every effort and the expenditure of large sums of money, however, it was not possible to attain the scheduled speed on this piece of track for a period of several months. This is one project where there is available rather full information in the form of letters and bulletins issued coincident with the work concerning the difficulties encountered in attempting to open a track for high speed. We believe the experience of the New York Central on this project effectually explodes the contention of the Interveners that it is practicable to reproduce a line of railroad in a condition which would sustain commercial operation at high speeds.

This instance also illustrates the general practice of this carrier with respect to the inclusion of costs of maintenance between the date of initial operation and the time when it considers the track capable of sustaining the designated speed. Expenditures for maintenance of the tracks from the beginning of operation on May 7 to the first of August were included in the costs. These maintenance costs during this period amounted to approximately \$2,600, or about 20 per cent of the total cost of the job. These expenditures were for surfacing and dressing and were necessary to cure defects in the track caused by operation. We have

already pointed out that this practice is contrary to the Commission's Classification of Accounts and that these charges are not proper to the capital account.

Exhibit 229, Curwensville to Bower.—This is an ordinary branch line with 19.61 miles of all tracks. The witness knew very little about the manner of construction. (Tr. p. 5810.) We have already pointed out the general practice of this carrier in adjusting the book costs in arriving at the reported costs. This is illustrated on this project. The ledger costs were \$22,515. During the 1919 investigation, \$1,988.37 originally charged to Accounts 3, 6, 8, 9, 10, 11, and 15 was transferred to Account 12, and \$79 deducted. During the 1925 analysis preparatory to this hearing, \$2,438.83 additional was transferred from other accounts and added to the total and \$886 deducted. In the absence of original records definitely describing the work, the propriety of these transfers could not be verified. By means of these adjustments the recorded costs were built up to \$25,977, to which was added \$1,612 as calculated costs.

Exhibit 230, Dowler Junction to Cherry Tree.—This project was constructed in 1903. The practice of making adjustments in the book costs as referred to above is further illustrated in this project. The ledger costs originally charged to Account 12 were \$3,715.20; during the 1919 investigation, 16 years after construction, \$14,756.80 was added and \$1,237.91 deducted. As the result of another slight

adjustment to the recorded costs in 1925 and the addition of \$1,560 as calculated costs, the total was increased to \$18,796. No doubt part of these charges are proper to Account 12, but, due to the meager descriptions of the work shown in the betterment records, there is no assurance that all these charges should be transferred.

Exhibit 231, Gardenville Yard.—Track-laying work on this yard occupied the period from November, 1906, to June, 1917. The total mileage is 71.6 and the average construction progress was thus only .6 of a mile per month. Part of this construction extended beyond 1914 and the influence of rising prices in the later years, of course, is felt in the total cost as set up. As this yard is very compact, being only four miles long and less than one-half mile wide, it would seem that work train expense for distributing material could be kept to a minimum. Over \$16,000, however, is charged for work-train service to this project. The witness did not know whether anything was charged during the entire construction period to Accounts 8, 9 and 10 for work-train service and did not see any particular reason for doing so. (Tr. p. 5295.)

Exhibit 232, Goldens Bridge to Brewster.—This is second main track work consisting of 7.32 miles of main track and 2.04 miles of sidings. The character of construction and the speed element have been previously discussed. Although the road was partially opened for commercial operation on June 14, 1907, and the remainder opened September 11,

1907 (Ex. 445), all expenditures up to July, 1908, are included in the study (Ex. 232). There are included in the totals the labor costs of surfacing, lining, and raising track for the period subsequent to September 11, 1907, amounting to about \$3,500. The inclusion of these charges after the beginning of commercial operation, of course, is wholly improper. These costs are subject to the same criticisms with respect to adjustments, the net adjustment being an addition of about \$6,000 out of the total reported cost of \$29,000.

Exhibit 233, Hyde Park to Germantown.—This project covers the construction of two additional tracks on the main line on the New York Central near Poughkeepsie, New York, where the traffic was heavy, with consequent interference from operation. Construction began October, 1911, and was completed in December, 1915, or four years to build 32.5 miles of track, the average progress for completed track thus being only 0.65 mile per month. We have already shown the effect of slow progress in increasing costs. The track work was performed in comparatively short stretches as fast as the grading was completed. Operation of disconnected sections began at four different dates between December, 1912, and June, 1915. It was necessary in placing these tracks under operation in this manner to make connections at several points with the existing operated track, an expensive process.

The ledger costs on this job charged to Account 12 originally were \$135,984. After various adjustments both in 1919 and 1925, among which was a deduction of \$69,516 for maintenance work on existing tracks, the reported cost of \$107,592 was reached. The adjustments represent more or less the interpretation of the accountants who made them, whose work was performed a considerable time after the construction took place, and who were forced to rely on records not entirely complete.

Exhibit 234, Lacona to Adams.—The line was placed in operation in sections at various dates between November 2, 1910, and January 14, 1911. (Exhibit 445.) Charges subsequent to January 14 when full operation began are supposed to be excluded, but expenses caused by operation prior to that date on parts of the line are included. The costs reported here illustrate the assumptions and interpretations necessary on all projects in making adjustments of the ledger costs. For instance, the witness assumed that an item of \$304 for surfacing and lining during the month of January was for work performed before January 14, because no work in that part of the country is done in January unless they have to. (Tr. p. 5276.) Another instance is the transfer of \$944.63 from Account 6 to Account 12. This amount is made up of labor items for bridgemen and bridgemen's helpers with the general description "putting in bridge ties and unloading bridge material." (Tr. p. 5277.) Putting in bridge ties is a proper charge but the un-

loading of bridge material, of course, is wholly improper to Account 12. Solely on the basis of this description the entire amount was transferred to Account 12.

Exhibit 236, Marble Hill Cut-off.—This is a short cut-off 2.92 miles of all tracks, on the main line of the New York Central within 10 miles of the Grand Central Terminal. The character of construction and the speed feature have been discussed heretofore.

The costs reported include the cost of maintaining two tracks from February 6, 1906, to November 1, 1906, and the remaining two tracks from October 1 to November 1, during which time the tracks were in operation.

Exhibits 238, Nepperhan to Ardsley.—This new second track, 3.61 miles in length, has been discussed before. Expenses chargeable to operation for labor maintaining the tracks were included from the time of beginning operation until the time the 45-mile speed was made effective.

Exhibit 240, Oak Grove (Avis) Yard.—Track laying on this yard project started in 1901 and was completed in February, 1904, over 15 years before the 1919 analysis and over 20 years before the 1925 investigation. In spite of the meager descriptions in the old records of the work performed, the book costs were increased over 100 per cent. The book costs for Account 12 were \$26,555.61. After the 1919 investigation, \$728 was deducted and \$31,873 transferred from other accounts to Account 12.

Witness Krake in preparing the exhibit deducted \$5,001 from the total set up in 1919 for work on tracks other than those covered by the exhibit and added to the remainder the calculated cost for rental of equipment. Adjustments so large in amount require substantial proof of their correctness before the total resulting therefrom can be accepted as representative of the actual expenses incurred, and such convincing proof has not been forthcoming.

Exhibit 241, Poughkeepsie to Hyde Park.—This project is the construction of 3rd and 4th main tracks on the main line of this carrier and is a combination of three separate projects, one embracing 9.34 miles of new track completed in January, 1915, another, 5.79 miles of new track completed in October, 1917, and the third embracing 3.28 miles of new track completed October 21, 1918. A small mileage of sidetrack was also constructed. These are in reality three separate projects and are not representative of the cost of a continuous construction of an equal aggregate mileage. Two of these projects were built after 1914 and the costs, of course, reflect the increased level of prices at an 18.7-cent labor rate. A number of the projects were omitted from the Interveners' summaries for the reason that they were constructed after the pricing period, and no good reason appears why this project should not fall into the same category inasmuch as a very large part of it was not built until after the pricing period closed. Although

this project is shown as having been constructed for a speed of 30 miles per hour, examination of the bulletins contained in Exhibit 445 indicates that generally trains were operated at speeds from 10 to 20 miles an hour at the beginning, and the 30-mile speed attained after a certain period of operation. This is another example of the fact that in actual construction carriers find it necessary to compact the roadbed by the actual operation of trains rather than by the expenditure of labor in extensive surfacing work.

The book costs include expenses incurred on the existing operated tracks and it was necessary to adjust these costs by making a deduction of about \$20,000. Expenses for work on the tracks after the time of opening for operation until the 30-mile speed was reached were included in the costs.

Exhibit 242, Richland to Lacona, and Adams to Watertown Junction.—This exhibit includes two separate second track jobs, one about 4 miles long and the other slightly over 12 miles long. Operation began at a speed of 15 miles per hour on October 30, 1909, and was increased to 35 miles per hour on November 21st. All expenditures prior to December 1, 1909, are included in the exhibit, there being no deductions for maintenance expenses before this date as far as can be learned.

This job illustrates the erroneous method of making estimates for rental of equipment. This calculation has been made in the usual manner, 177 engine days being derived by dividing the total

rowages of enginemen and firemen by the daily wage. Since this work covers less than 18 miles of track, this calculation results in allotting 10 days of work-train service for the distribution of each mile of track material. Under efficient construction methods on new work of any magnitude, a mile of track material could be distributed and laid in one day without the so-called advantage of an existing track. One of two conclusions must be drawn from this study; either these piece-meal construction methods inflate the costs of work train service and rental of equipment or Mr. Krake's estimate for these items is erroneous. One hundred and seventy-seven days' rental is charged on work train equipment which is assumed to consist of a caboose, five flat cars and one derrick car.

This is another case where a derrick car is charged for the full number of days without any evidence that the derrick was in the work train or that its work was confined to unloading material and, therefore, properly chargeable to Account 12. The witness assumed that eight boarding cars were used for a period of 150 days. There are no records to show the actual use of this amount of equipment and the estimate is based merely upon opinion of the witness. There was also charged a Linderwood unloader for 150 days at a rental of \$450. The only use which could be made of it is unloading ballast, which, of course, is a charge to Account 11 rather than to Account 12. The method of calculating rental of equipment in this case illustrates the prac-

tice employed in the other New York Central studies.

The total reported costs on this project are \$28,100, of which \$3,636 is the estimated cost of rental of equipment. Of course, there would be some costs for rental of equipment, but an addition of \$200 per mile as the estimated rental of assumed equipment is, on its face, exorbitant. It should be remembered that the carriers' reported costs for tracklaying and running surface are about equal to the engineering-report prices. It is apparent that the elimination of items such as just described on the various projects would have an important effect on the total reported cost. The Bureau is in no position, of course, to suggest substitute sums for such estimates.

Exhibit 243, Sanborn to Lockport Junction.—Less than 7 miles of second track is included in this construction. The calculated number of work train days on this project is 13.4, or approximately 2 days for each mile of track as contrasted with 10 days for each mile of track on the project discussed immediately above. The total estimated costs for rental of equipment is \$247 or \$38 a mile as compared with about \$200 per mile on previous project. This illustrates the lack of dependence that may be placed on estimates made 20 years after construction.

Exhibit 244, Schenectady Detour.—This is double-track construction connecting two operated lines and comprises 15.6 miles of track, requiring

from October, 1902 to August, 1904, to construct. The total cost includes the cost of placing 22 turnouts. The greater number of these turnouts are out of the main 4-track operated line between Albany and Buffalo. Undoubtedly the cost of placing turnouts in a heavily operated main line is far greater than similar costs in new construction. This strikingly illustrates the fallacy of deducting Bureau prices for accessories in the development of the pricing schedule. The unit cost for placing turnouts in this instance was \$62 as compared with the Maximum Memorandum 733 price of \$35 each and the engineering report price applied here of \$40. Of course, the deduction for this project was on the basis of the actual cost but in many cases the Bureau prices were deducted.

The record indicates that this work was involved with a rearrangement of old tracks and the costs charged to Account 12 included work on other tracks and operating expense charges. Deductions approximating \$20,000 were made from the book costs for improper charges and for work on other tracks. It would seem difficult accurately to separate these costs 20 years afterwards with meager records. The sketch indicates that the work is far from representative of new construction.

Exhibit 245, Storm King to Chelsea.—This project includes 12.83 track miles or about 7.98 road miles of new third and fourth track on the main line of the carrier between Poughkeepsie and New York. Construction took place in two parts. One

portion was built between 1912 and 1915 and the second part in 1916 and 1917. Although a part of this construction extends considerably beyond the so-called pricing period, the total costs have been included in spite of the fact that they reflect in part the increased level of prices. Although this work was done in two parts, the construction work was, as shown by the charges set out in Exhibit 440, practically continuous over the period from May, 1912, to September, 1917. Obviously this extended construction period has the effect of enhancing the total costs. No one will assert that a rate of progress not much greater than *two miles per year* is in any degree representative construction work.

The Account 12 book costs were \$80,611 but this amount contained operating charges for work on the existing line and charges proper to other accounts. The witness attempted to make deductions for these amounting to about \$28,000, and added about \$3,700.

Exhibit 246, Syracuse Junction to Churchville.—The same forces which built the new second track were employed at the same time on work on existing tracks. During this period nearly \$30,000 was charged to operating expenses for work on existing tracks.

The estimated costs for rental of equipment included in the costs of this job amount to about \$12,000. The charges originally made did not include anything for rental of a derrick. The witness knew

personally that a derrick was used on the job and added \$2,705 as the cost of this equipment for 541 days, the same number of days calculated for engine service. Several different sections of this new work were placed under operation at various dates. (Tr. p. 5392.) This of course involved the necessity of cutting into the main line to make the connections and this extra expense is reflected in the total cost.

This project illustrates a fundamental defect in the costs on many jobs with reference to material yard handling. For example, in August, 1907, there are two items aggregating over \$1,000, marked "loading, unloading and distributing rail and track fastenings" which are charged wholly to Account 12. Whatever amount is included in this total for loading material is not proper to Account 12. (Tr. p. 5388.) Many other large charges are described as "handling material," while some are marked "distributing material." There is no assurance that the term "handling" does not include loading. A number of charges occur between June and September, 1907, for labor "watching ties." (Tr. p. 5399.) This seems conclusive proof that there were at least temporary store yards established on this project in spite of the statement of the witness to the contrary. There would seem to be an untold amount of loading buried in the handling charges. Apparently only a very superficial investigation was made of the actual facts in this matter.

Exhibit 247 A, Thompson to Dresden.—Operation began on this piece of new second track on December 1, 1907, but ballasting was performed after that date. The construction accounts were kept open and the charges for surfacing and lining track are included from the beginning of operation until the 35-mile speed was reached in September, 1908. This is improper accounting.

This instance pointedly illustrates the difficulty encountered on many projects in separating Account 12 charges from other charges when other construction work or maintenance was being carried on by the same forces. A great deal of maintenance work was going on at the time of this new construction and the witness did not know exactly how operating and construction expenses were separated. The records are not very good on this project. (Tr. p. 5822.) The same gangs worked on the construction and the maintenance work so that an accurate separation is essential to determine the true cost of this work. In this case there is no verification of the accuracy of such separation.

Construction conditions on this project were a little unusual. A strike was in progress in the coal mines during the first part of the work and distribution of material was facilitated by the absence of regular traffic on the main line. However, during the last quarter of the tracklaying work the strike had been settled, and, as stated by Mr. Kittredge, "that stretch of track was alive with freight trains

handling tonnage coal moving very slowly so that the work dragged like everything, nobody could get anything done; you could not get the work train in there and they handled the material on revenue trains." (Tr. p. 6213.)

Exhibit 248, Utica to Stittville.—This job comprises less than 10 miles of track. The cost as reported has been subjected to adjustments as in other projects. In this project a derrick car is charged for the full number of days estimated for the whole work train.

Exhibit 249, Utica Yard.—Work on this project started in October, 1910, and was completed in June, 1917, a period of 7 years to construct 8 miles of main tracks and 49.2 miles of side tracks. The tracks were placed in operation at various dates as soon as completed. The long construction period as well as the manner in which construction was prosecuted makes this project dissimilar to construction under a theoretical reproduction. A general improvement was in progress at Utica at this time, some facilities being removed and others installed. A large amount was charged to operating expenses during the period of this new construction and some amounts have been transferred from operating expenses to Account 12 as the "reproduction cost of facilities replaced." The witness stated that this was merely an adjustment of ledger values. (Tr. p. 5789.) We have already mentioned the difficulty of accurately separating

operating expenses and costs of other work from proper costs to the tracks reported.

Most of the material was unloaded from the original cars as used or unloaded on the subgrade as near as possible to the point where it was to be used. (Tr. p. 5779.) In handling the material in this way it is quite possible that costs were incurred which are properly chargeable to the material accounts, but the witness made no examination of Accounts 8, 9, and 10 to see whether any handling charges had been made to these accounts. (Tr. p. 5780.)

Exhibit 250, Clearfield to Karthaus.—This project was constructed in 1901 and 1902. About 75 per cent of the ties were secured locally and stored along the right of way every two miles. The carrier's records are silent as to the manner of handling rail and other track material. The Bureau's representatives analyzed the costs of this project and found that there were no labor charges to Accounts 8, 9, and 10 for handling material (Ex. 442). Obviously the costs for handling the material are buried in the labor costs in Account 12. This illustrates that where the Bureau has secured definite information, it has found that material yard handling is in Account 12.

Exhibit 251, White Plains to Mt. Kisco.—The costs reported for this project have gone through a series of adjustments, the ledger costs of \$13,389 having been increased in the 1919 investigation to \$22,724. Deductions of \$2,605.90 were later made

to cover the cost of tracks not reported in the exhibit and other adjustments were made for estimated costs. Costs adjusted in this manner are at least doubtful.

PITTSBURGH & LAKE ERIE RAILROAD

Exhibit 252, Struthers to Youngstown.—This double-track new construction, 6.8 miles long, comprising 13.71 miles of main line and 11.32 miles of sidings, was begun in March, 1914, and charges are continued until June 30, 1916, so that it extends somewhat beyond the limits of the pricing period at a labor rate of 18.7 cents. As it reflects the increased costs for the later period, it should not be included. The first track was opened for operation on January 18, 1915, and subsequent to that date short sections of the second track were completed and placed under operation by connecting it with the first main track. Several such connections naturally tend to increase the total cost. The totals as finally set out in the exhibit are the result of a number of adjustments shown on sheet "D," so that the costs contained in this study can not be said to reflect in substance the books of the carrier. The progress on completed track was less than one mile per month, which is evidence enough that the work was not prosecuted in a manner comparable to reproduction.

WESTERN MARYLAND RAILWAY

Four construction projects on the Western Maryland Railway were presented in this hearing.

Witness Connet offered Exhibit 261 and witness Davis, cost engineer of the B. & O., presented exhibits 286-288, inclusive. During Federal control the Western Maryland was operated by the B. & O., and the cost studies on the three later projects were prepared at that time by the B. & O.

Exhibit 261, Big Pool to Cumberland.—This construction covers 69.28 miles of new line built between 1904 and 1906. The construction work was extremely heavy, there being five tunnels of a total length of 10,139 feet (Tr. p. 2063), and 23 steel bridges of a total length of 8,032 feet. The Potomac River is crossed nine times in a distance of 31.8 miles. (Tr. p. 2065.) Tracklaying work on this line was subject to a very large number of delays running from a few days up to four or five months, while waiting for the construction of tunnels or bridges. Sometimes only a few days' tracklaying work was done at a stretch. (Tr. p. 2070, 2077.) It is obvious that such piecemeal construction would tend to increase the cost above normal and unavoidably result in some duplication of work. In addition to the unusual features and the heavy nature of the construction work, a large number of slides occurred during construction, which accounts for some of the excessive charges for lining and surfacing.

Time books for this project were not available and the pay rolls and vouchers do not describe the work in detail. Apparently an arbitrary distribution of pay rolls to different accounts was made

about the time of construction. For example, on pay rolls for July, August, and September, 1904, it appeared that an arbitrary distribution was made of total sums, allocating one-third to Account 12 and two-thirds to Account 8, Ties. (Tr. pp. 2087, 2090.) The exactness of this proportion seems to be proof that the amounts do not reflect the actual work done.

The main line was constructed in several sections. The ten mile section on the east end began carrying freight in December, 1904, but was not turned over to the operating department until March, 1906. Except for one item of \$306, the costs of maintenance prior to June, 1906, are included in the costs. No charges to operating expenses for maintenance were made on the western 50 miles until June 30, 1906. A proper method of bookkeeping would require that these costs be charged to operating expenses and the inclusion of these items in the construction account is improper.

The total expense for camps and the use of tools was distributed on a judgment basis between Account 12 and other accounts. (Tr. pp. 2114, 2116.) There were also transferred to Account 12 from Accounts 6, 8 and 11, large amounts merely on the judgment of the witness without any definite information. It would seem that if the original distribution between accounts is to be accepted as to some items, the pay roll charges for example, it should be accepted as to all, and the practice of the witness is inconsistent in this respect. For instance, large

amounts for carpenter labor charged on the books to Account 6 were transferred by the witness to Account 12 for the sole reason that he could not imagine what the carpenters were doing on bridges at this period of construction except framing bridge ties. (Tr. pp. 2111, 2129.)

The witness transferred nearly \$27,000 from Account 11, Ballast, to Account 12 without any support whatsoever. He found about \$35,000 charged on the books for unloading ballast, and decided that this amount must include some of the cost of placing, because otherwise the unloading would cost 17 cents per cubic yard. He first estimated part of the yardage. He then deducted 4 cents per cubic yard for the assumed cost of unloading and transferred the remaining \$27,000 to Account 12. This project was constructed in 1904 to 1906. The records are meager and uncertain, and the witness was not familiar with the construction, having been in the employ of this carrier only about 9 years. This transfer was made without definite knowledge as to whether this amount included *anything* for placing ballast. Moreover, he used 4 cents as the labor cost of unloading ballast merely because Mr. Stone of the Pennsylvania had mentioned a figure which the witness adjusted to take care of any difference in cost that might be involved in shoveling the ballast out of cars. This sum was used without any clear knowledge of how the ballast was handled or the amount of it that was shoveled over the sides of gondolas.

A construction project involving such unusual construction conditions with so many adjustments in the recorded costs can not be regarded as reliable cost data.

Exhibit 286, North Fork Branch.—This exhibit covers the construction of a mine spur 2.226 miles long, built between October, 1914, and September, 1915, at a labor rate of 17.9 cents. Clearly a project of this size spread over so long a period is not useful data. Witness Davis admitted that a longer project would be more valuable. (Tr. p. 3561.) No investigation was made as to the speed permitted in 1915. (Tr. p. 3562.) The speed shown in the exhibit is taken from a 1925 time-table which, of course, has no necessary relation to the situation which existed in 1915.

The total reported cost of this project is \$7,400. This amount includes the entire cost of a temporary track amounting to about \$1,400, or about 20 per cent of the total costs, built a whole year before actual construction began. (Tr. p. 3567.) The reported costs also include charges after the line had been opened for operation in July, 1915, and an estimate of 5 per cent of the labor charges to cover the cost of supervision. (Tr. p. 3569.) This latter is an arbitrary sum which may or may not represent the actual cost of this element.

Exhibit 287, Georges Creek and Cumberland Railroad.—This job, covering 38.29 miles of new double-track line, was constructed as a part of the same project covered in Exhibit 288 and general

comments made with reference to the latter exhibit are applicable to this. No clear separation of costs between these two projects was originally made and certain costs were allocated arbitrarily on the basis of mileage. Although exhibits 287 and 288 form part of the same line and were constructed for the same speed at the same time with like labor rates the Georges Creek and Cumberland Railroad cost \$3,142 per mile as compared with \$2,672 for the Connellsville and State Line. (Tr. p. 3482.) A complete explanation of the higher cost on the Georges Creek and Cumberland is not apparent.

This exhibit includes an amount of \$4,894.81 for labor performed on track revision work (Tr. p. 3501) which the witness could not explain. From the description we must conclude that this charge would not be a proper cost in reproduction. A more detailed explanation of the manner in which this project was treated will be made in the discussion of exhibit 288 which follows.

Exhibit 288, Connellsville and State Line Ry.— This project illustrates well the manner in which the reported costs for many of the projects have been built up by means of calculations, estimates, prorations, and assumptions. Construction on this project, 85.83 miles of track, of which 67.924 is new first main, began in May, 1911, and was completed July 31, 1912. The line is built through a hilly country and 54 per cent of the track is curved. (Tr. p. 3364.) The speed shown as of construction date, 30 miles per hour, is assumed. The only in-

formation on this point was that freight trains ran at 35 miles per hour a year later. (Tr. p. 3376.)

For part of this work the carrier used its own locomotives and for the remainder rented locomotives from the P. & L. E. and the B. & O. No rental was charged on the books for the use of its own locomotives, and in estimating the rental of \$17,000 the witness took as a rental rate the simple average of a 94 cent and a 74 cent rate paid these two carriers. He did not know whether these rates included a profit or not (Tr. p. 3370), and there is no evidence that the 84 cent per hour rate adopted approximates the actual cost of this service to the Western Maryland.

The work train costs for Accounts 11 and 12 were not separated and it was necessary to estimate the part properly assignable to Account 12. The pay rolls were available in making up the exhibit, but there is on them no description of the work performed. Only a very few time books were available. (Tr. p. 3380.) However, foremen's reports were used in estimating the work train service.

The development of the amount of \$33,000 included for work-train service is extremely involved. The witness went through ten different steps before reaching his final figure, and estimates are used freely in the absence of anything certain. (Tr. pp. 3462-3464.) The computation starts with an attempt to allocate the number of work-train days as between unloading ballast, tracklaying and surfacing and miscellaneous work during *one period*

of the construction. For this purpose the witness consulted the foremen's daily reports and the weekly reports. Certain "equations" which he employs result frequently in assigning a work-train day to tracklaying when in fact the foreman's report shows no such work on that day. (Tr. p. 3400.) Again the witness assigns one day's work-train service for laying one frog. (Tr. p. 3402.) While the exhibit shows \$3,178.14 for wages of work-train crews during June, 1912 (Tr. p. 3446), no tracklaying work was performed that month. (Tr. p. 3448.) It would be farcical to claim that the result is a cost figure.

In estimating the amount of work-train service to be deducted in connection with material yard expense, the Bureau's estimates were employed. There is no proof whatever that these theoretical costs coincide with the actual costs on this particular project and consequently there is no assurance that the result of this computation approximates accurate costs.

The witness stated that camp expenses was prorated 80 per cent to Account 12 on the basis of the ratio of common labor costs in Account 12 to other accounts. (Tr. p. 3457.) Only 70 per cent, however, of the total labor cost is charged to Account 12, and therefore, the computation of camp expenses is erroneous. The total charges for equipping camp cars and converting freight cars are found in Account 12 with no salvage allowed. These cars had undoubtedly been used on other

work besides tracklaying (Tr. pp. 3425, 3437) and some other account should have received a portion of this cost. A credit of 33½ per cent was made for salvage on tools merely on the basis of his judgment. (Tr. p. 3455.) About one-third of all the tools purchased were bought during the last three months of the work (Tr. p. 3453) and it is unlikely that two-thirds of their total life was consumed during this short time. He did not know what use was made of these tools afterwards. During the construction period the B. & O. detoured its trains for a time over a part of this project, and any maintenance work caused by this operation appears to be included in the total costs.

The recorded costs include the cost of building what is known as the Paddock siding and as the study does not include this mileage, deductions are made supposedly to cover the cost of building it. The sum of \$3,865, therefore, is deducted for work-train service but only \$32.82 for tracklaying. (Tr. p. 3457.) The witness had no idea of the length of this siding. This lack of knowledge as to this and other features of the work did not deter him from attempting to redistribute the costs. If the charge for work-train service is correct it must represent a number of miles of track and the \$32.83 charged for tracklaying is, of course, a wholly ridiculous deduction.

This exhibit contains such a confusion of estimates prorations, and allocations that no one can say what the result represents and no weight can

be given to the figures reached. This fact did not prevent the Interveners from using it without alteration in building up the pricing schedule.

HOCKING VALLEY RAILWAY

Three construction projects on the Hocking Valley were presented in this case. One of them, the Limeville to Waverly job on the Chesapeake & Ohio Northern Railway, was omitted from the summaries because it was constructed after the pricing period.

Exhibit 263, Lancaster to Enterprise.—Construction on this second main track, 14.39 miles long, was commenced in May, 1902, and it was placed in use on May 8, 1903, except for two bridges. It thus took 12 months for the construction of about 14 miles, which is extremely slow progress. There was very heavy traffic on the first track during construction. (Tr. p. 1693.) The track was built by regular maintenance gangs who were at the same time doing maintenance work. Although these section gangs were on the spot, an estimate has been included for the cost of transportation of men. (Tr. p. 1700.)

The new track was put into operation in various sections (Tr. p. 1689) which necessitated expensive work in making connections with the operated track. There were two large bridges which were not completed as soon as the track was laid up to them, and at each end of these bridges the second track was cut into the first track and the single

track operated across the bridges. This required connections to be made, and then later taken out when the bridges were extended, and for this work charges are apparently included in the total.

The recorded costs for this job are \$35,590, but included in this amount are the costs of unloading ballast. The witness assumed the cost of unloading to be 5 cents per cubic yard, and, therefore, deducted only \$2,663 for that item, leaving a balance of recorded costs of \$32,927. The impropriety of deducting estimated costs from actual costs has already been mentioned.

The track was placed in operation May 8, 1903, but charges have been included through the month of October, 1903. (Tr. p. 1691.) To support the reported costs, the witness had only the ledger entries which did not give the details but merely stated the labor by months in lump sums described as "track labor." (Tr. p. 1687.) During the period May to October, 1903, inclusive, the charges included were \$17,540. Undoubtedly a part of these expenditures were proper to Account 12 for additional construction still going on, but due to the condition of the records, there is no way possible to make a separation between construction and maintenance costs.

The witness then added to his recorded costs of \$32,927 an estimated sum of \$7,375 for work-train service, rent of equipment, tools, and miscellaneous. This estimate was arrived at by a percentage developed on the Limeville to Waverly project con-

structed in 1917. As this latter project was constructed during the period when prices had advanced considerably, the percentage developed from this more expensive job, even if it were correct, may or may not represent conditions which would exist in a lower price period. It would seem that the Interveners in addition to omitting a 1917 job from their summaries should also exclude jobs, the costs of which are estimated on the basis of 1917 figures. We think, however, that the percentage developed in the Limeville to Waverly project is of little value, as there were only lump sum charges on the books for work-train service, rental of equipment, camp supplies, and miscellaneous for both Account 11 and 12 work. An arbitrary distribution of the costs was made between these accounts, 10 per cent to Account 11 and 90 per cent to Account 12 with no information as to the actual cost. (Tr. p. 1743.) Obviously this allocation to Account 12 is out of proportion to the amount properly chargeable to that account.

Exhibit 264, Kimberly to Beaumont.—This project comprises 5.7 miles of second main track, and was constructed between March, 1911 and October, 1912, a period of approximately 18 months, by regular maintenance forces who divided their time between maintenance work and the construction work. In many cases the distribution between construction and maintenance is made on an arbitrary basis of one-half to each class of work. (Tr. p. 1715.) The first main track was very busily operated at

this time. The conditions surrounding the construction of this work were not such as to make it useful in estimating reproduction costs for the ordinary line of railroad.

Operation began in September, 1911, but construction charges continued until August, 1912. (Tr. p. 1704.) As in the previous project, the cost of unloading ballast was included in the book costs to Account 12, and a deduction of \$1,304 was made at the rate of 5 cents per cubic yard, which is subject to the criticism previously made.

To the recorded costs of \$15,381, there were added estimated costs of \$3,490 for work-train service, equipment, tools, and miscellaneous. The division of work-train service, etc., between Accounts 11 and 12 is likewise based on the percentage referred to in connection with the preceding project which is clearly erroneous.

CHICAGO, INDIANAPOLIS & LOUISVILLE RAILWAY

Exhibit 265, Wallace Junction to Victoria.—This study comprises a total of 55.892 miles of track. The work was done by contract, some of the railroad officials being also officials of the construction company. The witness agreed to furnish later for the record the contract between the carrier and construction company, but we do not find that this was done. The total ledger costs to the contractor for constructing this line and certain other mileage was \$97,045.46. Of this amount the witness deducted \$14,611.06, which in his opinion was the cost for

tracks not included in the study. Various deductions from and additions to the recorded costs were made in order to obtain what the witness claims is proper to Account 12. He deducted \$6,902.72 as being proper to other accounts and added \$6,095.48 as costs found in other accounts. By this process he arrived at \$81,627.16 as the recorded costs proper to Account 12. This redistribution, recently made, depends entirely upon interpretations placed upon vouchers made in 1906 and 1907. The description of some of the items now included in the costs are sufficient to cast doubt upon the propriety of charging them to Account 12. For instance, there are numerous charges for "loading ties" (Tr. p. 1941), "loading steel" (Tr. p. 1941), and "watching crossing" (Tr. p. 1942). It was also necessary to prorate many lump-sum items between Account 12 and other accounts.

To the recorded costs, adjusted as explained, he added an estimate of \$18,041.57 for rental of equipment and transportation of men. The manner of arriving at this estimate illustrates the practice adopted on many jobs. As there were no records as to number of work train or camp cars, the witness estimated the number of such cars and the length of use. The rental applied for both camp and work train cars was 50 cents per day. Even though this equipment was not usable in commercial service (Tr. p. 1905), the rate used exceeded the per diem rate then prevailing of 45 cents. This estimate amounts to \$12,983, or about \$240 per mile. An

amount of \$4,591.99 is set up as an estimate for transportation for "hobo" gangs that were employed in construction. As Chicago is the nearest large labor market, he assumed that all men who had ever been employed were transported to and from that point. He consulted the time books, found the number of new men taken on and the number discharged and computed the transportation. A substantial estimate was also added for placing bridge ties. Such estimates obviously have very little evidentiary value.

BESSEMER & LAKE ERIE RAILROAD

Exhibit 270, Ford No. 3 Branch.—This exhibit comprises 3.41 miles of new branch line constructed between the latter part of 1913 and the early part of 1915. (Tr. p. 1985.) The work was done by company forces, the track-laying gang also doing the grading work. In some places the track was laid on temporary trestles and used in connection with filling in these trestles and bringing up the grade. (Tr. p. 1991.) On the whole line the tracklaying followed the grading closely.

On a part of this branch slag was placed for use in the subgrade and for ballast purposes at the same time, and there was no record of the quantities unloaded, as no distinction was made between slag for ballast and slag for subgrade. In his exhibit, however, the witness used the quantities prescribed for the standard ballast section on the Bessemer. (Tr.

p. 1994.) He attempted to separate the cost of placing ballast from that of placing grading material by an inspection of the time books, but the accuracy of this distribution could not be tested, inasmuch as he did not have with him the charges to Account 3 for placing this slag in the subgrade. (Tr. p. 1994.) On other parts of the line excess slag embankment was raked up and surfaced as ballast. (Tr. p. 2006.)

This line was opened for regular operation on December 24, 1914, although a few coal trains had been hauled out from a mine before that date. (Tr. p. 1989.) Of the total costs of \$9,600 about \$1,000 was spent between the date of operation and May, 1915, most of which was for raising track and surfacing. As far as the witness knew no regular maintenance charges were made prior to May, 1915. (Tr. p. 1992.) The exhibit shows a speed of 20 miles per hour as of construction date. Freight trains actually operated at about 10 miles per hour, but the witness assumed that the track was good for 20 miles per hour for passenger trains, although none was run. (Tr. p. 1991.)

A small construction project such as this, which took well over a year to complete and on which track was laid only 300 or 400 feet at a time and which was used to aid the construction of the road as a whole, is not representative of reproduction conditions. The manner in which the costs were kept gives no assurance that the costs presented give a

true picture of the amounts properly chargeable to Account 12.

Exhibit 271, Kremis to K. O. Junction.—This project comprises 8.87 miles of new main line. The skeleton track was apparently completed in May, 1902, and although operation began June 1, 1902, according to time tables, substantial charges were included up to September. Section gangs were not placed on the line until September 1, 1902, and there are no separate charges for maintenance to operating expenses prior to the latter date. (Tr. p. 2010.) It seems certain, therefore, that an indeterminate amount of maintenance charges finds its way into the costs set up in this exhibit. Nothing very definite was known as to the actual speed at the close of construction accounts but an estimate of 20 miles per hour was made.

At the time of this construction, there was no Account 12 as such, and the witness went through the books and selected items he regarded as proper to that account. These records were not produced at the hearing. The amount charged on the books for "ballast" includes Account 11 charges for work-train service and labor unloading, as well as the proper Account 12 charges for placing ballast. In absence of any record costs the witness was forced to estimate the proper deductions for Account 11 charges. (Tr. p. 1965.) As the quantity of ballast placed at the time of construction was unknown, the supervisor estimated the number of cars unloaded and then the witness estimated that each

car contained 40 cubic yards of slag. Thus three estimates were made to determine the amount to deduct for unloading ballast.

A previous report covering this project was made to the Presidents' Conference Committee, which showed a different cost. There are various additions in this present report with apparently little to sustain their correctness. For example, an examination of records brought the witness to the "conclusion" that a sum of \$466.13 omitted from the previous report should now be included in the total cost but he could not give the basis for this conclusion and could supply no records to support it. (Tr. pp. 1967, 1968.) The reported costs for this project can not be accepted as indicative of the actual costs.

Exhibit 272, Mercer Junction to Cool Spring.— This exhibit covers 3.62 miles of new main line built to eliminate an "S" curve in the old track. The new track crossed the old line in the middle. (Tr. p. 2014.) It is apparent, therefore, that this construction, even though very short, involved the making of four connections with an operated track, which necessarily enhanced the average cost per mile beyond normal. The track was built by extra gangs, who were sometimes transferred to other construction work (Tr. p. 2016), and occasionally performed maintenance work (Tr. p. 2039). This practice makes it important that a very accurate distribution of the time of the men be kept and this could not be verified in the present instance be-

cause the witness brought only a few time books as samples.

As on the other Bessemer jobs tracklaying followed grading closely, the new track being used to aid the rest of the construction work. The south end of the track was placed in operation before the northern portion (Tr. p. 2018), and apparently all maintenance expense necessitated by this operation is included in the reported cost. The quantity of ballast shown is a pure estimate; the witness could not supply even the details of his estimate. (Tr. p. 2021.)

In several instances charges for loading material are included in the exhibit total. (Tr. p. 2028.) These items had at one time been charged to the material accounts and a transfer to Account 12 had subsequently been made on the books, but prior, however, to the time this witness consulted the accounts. (Tr. pp. 2035, 2036.) The witness accepted the distribution to Account 12 in preparing the exhibit with no more information than the description "loading material." The more reasonable assumption would seem to be that these are proper charges to the material and as such should be excluded from this exhibit.

This project is too short to be of particular value in estimating reproduction cost. On any job, a certain length of time is required to get an organization working efficiently (Tr. p. 2041), and it is evident that on a short project this overhead expense is disproportionate. None of the Bessemer projects

is as much as 10 miles long and for this reason, if for no other, their usefulness is very much impaired.

ELGIN, JOLIET & EASTERN RAILWAY

Exhibit 273, Rockdale Junction to Rockdale.—

This project, 7.58 miles long, is somewhat in the nature of a belt line around the city limits of Joliet, Ill. Work was started in October, 1904, and completed in June, 1905, the heaviest charges coming in the months when the weather was most severe. (Tr. p. 1829.) No separate material yard was established for the project, as it was close to the general material yard. The method of construction on this job was somewhat unusual. (Tr. p. 1844.) Tracklaying followed the grading very closely. When it happened that the grading was incomplete at any point material was unloaded from the work train and teamed ahead to the next piece of completed grade and track laid at that point. When the intervening grading was completed the two separate portions of track were connected. This, of course, is far more expensive than the usual manner.

This is one of few instances where the original time books were produced and illustrates very strikingly the difficulty of accurately determining the costs 20 years after construction. The accounting records on this project were extremely indefinite, and a great many interpretations of the cost items by a man not familiar with the work were necessary in order to arrive at the costs shown in the exhibit. (Tr. pp. 1838, 1841.)

The work was done by section men who were also engaged in regular maintenance. The distribution of the charges between accounts was not made until 1925 when accountants examined the time books and attempted to redistribute the items from the meager descriptions appearing therein. (Tr. p. 1836.) The accountants had no other information, and if the description of the work in the time books was inadequate it was a matter of interpretation to pick out the Account 12 charges. For instance, there was no way to determine whether an item for "loading material" referred to work in a material yard or to reloading material which had once been unloaded at the site of the work. (Tr. p. 1838.) Numerous illustrations are found in the record where the witness could not be sure as to propriety of charges to Account 12. (Tr. pp. 1840-1856.) He stated that the distribution was *simply a matter of judgment*, with no information to guide them other than the meager description of the work shown in the time books (Tr. p. 1838), and that he could not definitely say what items were proper to Account 12. (Tr. p. 1840.)

The road was placed in operation February 14, 1905 (Tr. p. 1834), but maintenance costs were included in the construction account through the months of February and March, 1905, April being the first month in which maintenance was charged to operating expenses. (Tr. p. 1858.) A substantial part of the roadmaster's salary was charged to

this construction, although he also had supervision over operation of about 113 miles of road. (Tr. p. 1859.)

The cost for work-train service for the entire construction was not divided upon the books, and from the records the witness determined that an engine was used 110 days. He apportioned work-train service on the basis of two days to Account 6, two days to Account 13, with the remainder divided equally between Account 11 and Account 12, 51 days to each account, on the assumption that the amount of work performed was about the same. In estimating rental of equipment, however, he assumed 135 carloads of material for tracklaying and that each car would be used an average of two days each (Tr. p. 1862) as compared with his estimate of 1,271 carloads of ballast, the cars likewise being held two days each. (Ex. sheet 4.)

Substantial estimates were made for rental of equipment and for fuel, oil, and waste. The latter estimate was determined by taking the normal daily consumption of fuel, oil, and waste, and applying it to the number of days the work train was presumed to be on the job. The witness however, could not remember which projects were used to ascertain the normal or average amount. (Tr. p. 1861.)

In view of the condition of the records, little use can be made of the reported costs as being a reliable guide. At best they represent merely an opinion as to the costs formed 20 years after construction.

BANGOR & AROOSTOOK RAILROAD

General Comment

The six projects presented by the Bangor and Aroostook comprise the largest amount of strictly new construction on any one carrier in Eastern territory. The mileage totals 257.03, or about 11% of all the mileage used by the Interveners. Nearly 1,200,000 cubic yards of ballast were placed on these jobs, or about 13% of all the ballast in the Interveners' summaries. Inasmuch as this work appeared to be somewhat comparable to reproduction, the Bureau hoped that the costs could be obtained with sufficient accuracy to afford reliable information as to the complete cost of tracklaying and surfacing on really representative projects. Investigation of the reported costs, however, discloses that a very substantial portion of the totals is made up of estimated costs of placing ballast. These estimates rest on practically nothing but the opinion of the witness who presented the exhibits, and we believe that the results obtained by means of them are erroneous. It is to be regretted that jobs apparently comparable to reproduction in character of work lack an accurate record of costs.

All of these projects were built by contract. The carrier let the work to the Aroostook Construction Co., which employed a general contractor. He in turn let portions of the work to subcontractors. The prices for tracklaying and running surface varied from \$300 to \$500 per mile which included

practically all the cost, very few facilities being furnished free to the subcontractor.

These prices are a great deal lower than the costs obtained by the Interveners on most of the work, such as line revisions and second track construction performed by other carriers. This is significant in view of the fact that the Bangor and Aroostook projects, as we have stated, constitute the only substantial amount of new construction in the East between 1900 and 1914. Yet these prices were considered high for the work, the contracts reciting that the "prices were assented to in a spirit of liberality."

In view of the weight likely to be attached to the costs of work which is somewhat comparable to reproduction, the Interveners have apparently left no stone unturned in an effort to seek out additional costs. By what we consider to be an erroneous computation of proper Account 12 ballasting charges, and by the transfer of numerous maintenance charges to Account 12, the costs have been increased considerably. In spite of these improper costs, however, the Engineering Report prices in all but one case exceed the reported costs by an appreciable margin.

The ballasting on these jobs was done under a contract unit price which in all cases included the production, loading, hauling, unloading, and placing of the ballast. The railroad company furnished only the pit. In order to separate the Account 11 charges for producing, loading, hauling

and unloading ballast, the witness deducted an estimated cost. He stated that this estimate was based in part upon some incomplete studies made by him on a part of the project reported in Exhibit 279-a. On this job the embankment was brought up to grade by "train filling." (Tr. p. 3113.) The same material was used for grading and ballast and was dumped from trains at one time. The witness stated he kept track of the separation of ballast costs between Accounts 11 and 12 during three months of this work. How any accurate records could be kept when the operation was performed in this manner is not readily explained. What data the witness had showed the Account 11 cost to be from 12 to 15 cents per cubic yard (Tr. p. 3050), but it was admittedly very incomplete. No definite ratio was developed and applied to the other jobs; merely an estimate based on the above figures was used. Information as to the average haul on ballast was not available, and was not considered in applying the estimate. Since the expense of haul varies with the distance it would seem essential that something be known about the length of the haul before any estimate could be attempted.

As a rule the witness estimated that about 35 or 40% of the contract price covered Account 11 charges, and the remainder was the proper Account 12 charge for placing the ballast. Thus where the contract price was 35¢, he allotted 13¢ to Account 11 and 22¢ to Account 12. As a check upon the

accuracy of the witness' division, it may be pointed out that the amount used in the Bangor and Aroostook final valuation for ballast in both Accounts 11 and 12 was 45¢ per cubic yard, of which 25 cents was in Account 11 and 20 cents in Account 12. Had the engineering report ratio been used here, as was done by some of the carriers in their estimates, the amount chargeable to Account 12 would be materially decreased. Applying this ratio to the yardage involved the Account 12 costs on the six jobs would be \$197,881 instead of \$266,976, as estimated by the witness. This is certainly as reasonable a basis as that used by the witness, and illustrates clearly what a material difference is brought about by the adoption of a different method of estimate.

We do not suggest that the application of the engineering report ratio is the correct way to separate these costs, but it does indicate that in the Commission's opinion the Account 11 costs form the greater proportion of the combined cost of Accounts 11 and 12.

Furthermore, where the contract prices including both Accounts 11 and 12 were higher, the witness increased the amount allotted to Account 12 proportionally. This is obviously improper, as any variation in the combined price will not ordinarily be due to a difference in the cost of placing but rather in the Account 11 cost, due to a difference in length of *haul*. There is no warrant for using a direct proportion, inasmuch as the variation in combined cost reflects only the difference in Account 11

costs, and has little or no effect on the cost of placing.

A mathematical error appears to have been made in preparing Exhibit 279-a. The combined Account 11 and 12 price for part of the ballast placed in winter was 70¢. The Account 11 cost was estimated to be 43¢, but the cost of placing ballast was obtained by multiplying the yardage by 37¢. This of course should have been 27¢, and the error of 10¢ per cubic yard increases the Account 12 cost over \$2,000.

The tracklaying on all of these jobs was done in short pieces. It closely followed the grading operations and in all cases the skeleton track was used for construction purposes. This fact undoubtedly necessitated a certain amount of maintenance, and other accounts should be charged with some of this expense. In nearly every case it will be noted that section crews were put on to supplement the contractor's work and it seems clear that a portion of this labor cost should be allotted to some of the other accounts benefited rather than including the whole amount as has been done to Account 12.

Exhibit 274, Searsport to South Lagrange.—This construction work, 73.91 miles of main line, was started in May, 1905, and trains began to operate in November of the same year. Ballasting, however, was not completed until late in 1906. The study includes charges amounting to nearly \$2,200 for section crews who did ballasting and surfacing work in 1906. (Tr. p. 3043.) The witness stated

that this was work which the contractor was supposed to complete under his unit price, but which, for some reason, he failed to do. No deduction was made from the contract price on account of his failure to comply with the full terms of the contract. (Tr. p. 3050.) The study includes, therefore, a double payment for the same work. Moreover, these payments for company work were made during 1906, when the track was under operation, and it is entirely probable that some of this work at least was necessitated by the operation of trains and is properly chargeable to maintenance.

Exhibit 275, Northern Maine Junction to South Lagrange.—This project covers the construction of 27.81 miles of second track. The exhibit contains an item of \$847.70 for changing a double track previously laid over to a new location, due probably to an error in the original construction. (Tr. p. 3060.) There are also items aggregating \$1,218.56 which are described as "changing track" and "changing switches." This expense was occasioned by the fact that two bridges when constructed were apparently not large enough to accomodate double tracks, and when the second track was laid it was first cut into the existing main track at the ends of the bridges. Later the bridges were widened and the second track had to be moved over. (Tr. p. 3059.) It is quite apparent that these expenses would be wholly absent in a reproduction of the existing line.

Payments made for extra gang labor, aggregating about \$1,600, cover surfacing work done to get the track ready for operation. This expense was incurred by carrier forces although the contractor was required under the terms of his contract to turn over the track in a finished condition. No deduction was made from the contract price for his failure to fulfill his agreement in all respects. (Tr. p. 3061.) Apparently we have here another illustration of a double payment for the same work.

Exhibit 276, Medford Extension; South Lagrange to Packard.—Construction on this project, covering 30.05 miles of new main line, commenced in June, 1907. The contractor substantially completed the tracklaying and ballasting in the Fall of 1907. Section crews were put on as early as October, 1907, although operation did not begin until May 11, 1908. Charges included in the exhibit continue in substantial amounts until September 15, 1908.

The entire expense of the section crews from October, 1907, to May, 1908, totaling \$5,172.96, was charged on the books to operating expenses and changed by the witness to Account 12 for this study. The witness did not have very positive information as to what these section crews were doing. A few trains were run irregularly, and it was necessary to keep the road in some sort of condition for emergency operation. (Tr. p. 3075.) For the period from May to September, 1908, one-half of the wages of the section crews, \$2,027.85, was assumed to be chargeable to maintenance during construction.

This 50 per cent allocation between operating expenses and construction expense was based solely on the judgment of the witness with no record to substantiate it. (Tr. p. 3074.) In addition to the section gangs extra crews were put on the work by the company from April to September, 1908, and were engaged in lifting, surfacing, and lining work. The witness assumed that \$2,220 paid to these crews was properly chargeable to Account 12, for work in relining track previously lifted on frozen ballast.

The reported costs also include a total amount of \$3,030 paid to a subcontractor for delays. The witness thought that these delays were caused by the subsidence across the bogs, but had no positive details. (Tr. p. 3069.) He could not state positively whether this subcontractor's unit price for ballasting included Account 11 charges, although he doubted that it did. If the fact should be that Account 11 charges were involved, a part of this expense of delays should also have been allocated to Account 11.

Exhibit 277, Keegan to Grand Isle, and Ft. Kent to St. Francis.—The construction work on Exhibits 277, 278, and 279a was let by the Aroostook Construction Company to a general contractor who in turn sublet to subcontractors. On all three of these exhibits a 6 per cent profit to the general contractor has been added into the totals. It is assumed that the accounts paid to the subcontractors who actually did the work include a profit to them, and the inclusion in the cost statement of a general con-

tractor's profit is not representative of the actual cost of doing the work by the party who performed it.

Under the contracts, the subcontractors were furnished transportation for men over the B. & A. by the Aroostook Construction Company at the reduced rate of 1 cent per mile. The Construction Company paid the carrier the difference between the reduced rate and the regular tariff rate of $2\frac{1}{4}$ cents, amounting to \$10,000 for all accounts on all 3 jobs. As he could not determine the actual cost proper to Account 12, the witness arbitrarily allocated \$1,000 as the cost of transportation of men on each of the three exhibits 277, 278, and 279. (Tr. p. 3079.) The propriety of making any addition is questionable.

No deduction was made from the contract price on this job because of the fact that the contractor failed to finish the work according to the terms of his contract. (Tr. p. 3083.) An amount of \$1,826, the estimated proportion of the labor of section gangs chargeable to Account 12, between October, 1909, and August, 1910, has been included. From memory the witness estimated the proportion of the total work done by the section gangs which should go to Account 12 and fixed a percentage of the total amounts accordingly, varying from one quarter to three quarters of the total cost of each particular piece of work. (Tr. p. 3097.) These items cover such work as changing and relaying

rail, ballasting, lifting sags, picking up steel and the like, the most of which suggest from their very description maintenance rather than construction work. (Tr. p. 3088.) It is obvious that the amounts included in the exhibit can not be confirmed by any records and find support only in the memory of the witness as to details occurring many years previous.

Exhibit 278, Grand Isle to Ft. Kent.—Construction of this branch line of 29.94 miles was completed in 1910. During that year two contractors applied ballast on the entire road at prices of 35 cents and 37 cents per cubic yard. The road was placed in operation in November, 1910, and considerable difficulty was experienced during the winter's operation. As a result, additional ballast was applied over the whole line in 1911 by a third contractor at a unit price of 42 to 50 cents per cubic yard. (Tr. p. 3093.) Some of this ballasting and surfacing work which took place in 1911 was obviously necessary to take care of current maintenance and therefore, in part at least, should be charged to operating expense. The difference in contract prices for placing ballast, ranging from 5 to 15 cents per cubic yard between the 1910 and 1911 work, may be ascribable to the fact that the ballasting in 1911 was of a "patchwork" nature done under operation.

One-third of the total wages of the section crews from the beginning of operation November, 1910, to September, 1911, amounting to \$3,731, has, for

some undisclosed reason, been transferred from operating expenses to Account 12. (Tr. p. 3097.)

Exhibit 279a, Squa Pan to Stockholm, and Presque Isle to Mapleton.—This project covers a total of 61.69 miles of new branch line and was built between September, 1909, and June, 1910. In order to get the track ready as early as possible it was necessary to continue construction during the severe winter, which admittedly caused additional expense. (Tr. p. 3107.)

The reported costs include wages of an extra crew during January and February, 1910, of \$7,503 and the total wages of section crews from February to June, \$5,469. (Tr. p. 3106-3108.) The contract price for this job contemplated that the work would be entirely completed by the contractor and the extra expense was necessitated by the unusual manner in which the construction was performed. A number of extra bills include charges which are apparently improper; for example, changing switches and loading ties. (Tr. p. 3102.) The general contractor's percentage, amounting to \$2,433.93, has been added into the total shown in the exhibit.

The skeleton track was laid on the incomplete grade and used to bring the embankments up to the proper level by "train filling." (Tr. p. 3113.) A part of the labor of section crews was expended in blocking up the skeleton track so that the work trains could operate and it is apparent that some of this labor benefited the grading work. Since

the skeleton track was used as a construction track, some part of the expense of maintenance during construction should be charged to the grading account and a portion of the extra crews' labor should also go to Account 3. This was not done, however, the total cost remaining in Account 12.

CENTRAL RAILWAY OF NEW JERSEY

Exhibit 282, Vineland Branch.—This project comprises less than four miles of branch line. Original records such as time books and pay rolls were not available and the construction ledger and vouchers do not describe the nature of the work being done. (Tr. p. 2231.) Questionable items appearing in the exhibit could not be verified because of the absence of underlying details. Ballast quantities were estimated in the absence of records.

Operation began some time in June, 1909, and all ballasting was presumably completed at that time. (Ex. 282.) Out of the total costs of \$4,610.95 for this small project, there is no explanation of an amount of \$1,097 charged subsequent to operation during July, August, September, and October and included in the exhibit total. The witness could not explain the nature of the work being done during those months and he did not know when the first separate charges were made to operating expenses for maintenance. (Tr. p. 2234.)

No material yard was established on this project and it was necessary for the work train to go 50 or 60 miles to obtain material. (Tr. p. 2251.)

This, of course, is an exceptionally long haul and tends to increase the expense. The effect of prosecuting the work in this fashion is that handling charges normally found in the material accounts become chargeable to Account 12. Under the Bureau's reproduction estimate such handling charges would be largely cared for in the material accounts. The work was done in a more or less piecemeal fashion by maintenance-of-way employees who were also engaged in regular maintenance at the same time. (Tr. p. 2253.) The work train was charged to this project for 640 hours, or 64 days, which allows about 18 days for handling material for each mile of track. The per-day costs for work-train service appear conservative, but the project illustrates well the increased work-train service caused by slow construction. Ordinarily the material for a mile of track would be transported in a maximum of 20 cars, and it is difficult to understand why 18 days would be required to unload that much material. Either the work-train crew built the track or were engaged in general maintenance work in that locality and the costs were charged to this project.

In view of the small size of this job and the inadequacy of the records little weight can be given to the costs set up in the exhibit.

BALTIMORE AND OHIO RAILROAD

Exhibit 284, Somerset to Acosta.—Although the Interveners insist that they have included only costs proper to construction or such costs as are

necessary after opening for operation to bring the track up to scheduled speed, it was found in those cases where the facts could be developed that maintenance charges proper to operating expenses have been included in the costs, a fact which is illustrated on this project. Construction on this job, 11.737 miles of all tracks, was commenced in October, 1910, and was completed, ready for operation on July 31, 1911. (Tr. p. 3519.) The construction engineer advised that on that date the tracks had "settled down to a very fair condition" as work trains had used the track quite frequently. (Tr. p. 3519.) Operation began on August 2, 1911, and the track "held up admirably" under the heavily loaded coal cars. However, the maintenance of way forces did not take over the track at that time and maintenance was charged to construction. (Tr. p. 3521.) A letter from the construction engineer on August 29, 1911, recites the fact that construction forces had been maintaining track "gratis" and asked to be relieved. (Tr. p. 3520.) The record is silent as to when this request was complied with, but it does show that expenditures were included for 6 months after opening for operation. Of the total reported costs of this project, \$37,982.41, \$25,224.65 was incurred prior to operation and the remaining \$12,757.76 subsequent thereto. There were no time books or pay rolls available to verify the distribution. The total amount of ballast on this project was 36,798 cubic yards, of which 26,977 cubic yards were placed

prior to date of operation and 9,821 cubic yards placed subsequent thereto. This was the only construction work done subsequent to operation. (Tr. p. 2377, 3519.) It is absurd to say that the expenditure of \$12,757.76 represents only the expense of placing this amount of ballast. The labor charges during September, October, November, and December for lining and surfacing aggregate over \$6,000 and during this period there were apparently placed only 2,762 cubic yards of ballast. Obviously the major part of these expenditures were for maintenance.

Neither can it be said that these expenditures were necessary to bring the road up to the maximum permissible speed. The witness had no accurate information as to the speed permitted for the first operation. He shows a speed of 25 miles per hour, which was taken from a 1918 time table, although the road was built and put into operation in 1911. (Tr. p. 3522.)

It should also be observed that there was approximately \$1,000 included in the costs for work-train service subsequent to operation after all tracklaying had been completed and while the men were engaged in lining and surfacing. There is no occasion for work-train service to Account 12 during this period. The work-train service on this job amounts to \$489 per mile (Tr. p. 3528), which is about twice as much as this item cost on any of the other Baltimore and Ohio or Western Maryland jobs presented by this witness, and no definite explanation for the

great variation in this item was advanced. On another project, he estimated the cost of work-train service at \$100 per mile. As an instance of the apparent lack of care with which this exhibit was compiled, it will be noticed that for the month of June, 1911, all the fuel for the work train is charged to Account 12, although the labor of the work-train crews is spread over Accounts 3, 11 and 12. (Tr. pp. 3549, 3550.)

The contractor who did the grading was paid \$1,514.70, which was charged to Account 12. (Tr. p. 3550.) No information was available as to the nature of the work covered by this payment and there is no apparent reason why the grading contractor would be connected with the tracklaying work.

In developing their pricing schedule, the Interveners deduct tracklaying and surfacing and placing specialties at engineering report prices and ballast at maximum memorandum 733 prices. The excess costs on projects such as this consisting principally of maintenance during operation and improper charges are thus projected into the pricing schedule.

PENNSYLVANIA RAILROAD

General Comment

We direct especial attention to the presentation of costs by this carrier. Studies of the cost of tracklaying and surfacing on 13 jobs on the Pennsylvania were presented by witness Hultgren as Exhibits 289 to 303, inclusive. Three of his ex-

hibits are based on costs appearing in the construction ledgers of the carrier. The ledgers do not in any case show the detailed costs proper to Account 12 and adjustments in the form of additions and deductions were necessary in all exhibits. The witness was not familiar with the actual details of the construction work on any project, not having been present on the work and no other witness was offered to give any information on this point although Mr. Stone, Valuation Engineer of the Pennsylvania, who was familiar with the work on many of the jobs, was present in the hearing room. (See Tr. p. 5193.) The witness, except as to one project, made no attempt to find out anything about the manner of construction; indeed, he was not even interested, as he did not regard it important. We have pointed out heretofore the necessity of knowing something as to the manner of doing the work in order to be able to determine whether or not the cost data would be useful for reproduction purposes. With respect to this important feature, therefore, the Commission is without information and can only speculate as to the exact situation.

Ten exhibits presented by the witness are based upon a study made by a former employee of its valuation department, known as the "Blue Book", presented in this case as exhibits 302 and 303. (Exhibits 302 and 303.) Witness Hultgren had nothing to do with its preparation and consequently was unable to verify any of the information contained therein. In preparing his exhibits, however,

he resorted to the "Blue Book" for the description of the work and made free use of any other information found in it. The costs set up in his exhibits were transcribed from that document with no investigation other than to check the amounts against the lump sums shown in the ledger. Exhibits 302 and 303 were received in evidence over the objection of the Bureau as no one was presented to vouch for their accuracy. Inquiry as to manner of construction and propriety of charges was thus thwarted by failure to offer some one familiar with the preparation of the costs. The only details back of the study are the ledger sheets on which appear only lump-sum items. The importance of inspecting the underlying details is illustrated by the Cape Junction to Kiptopeke project (Ex. 299), where the vouchers were furnished and where it was found that many of the charges were improper to Account 12.

Most of the Pennsylvania jobs were performed by contract. The contract prices for tracklaying and surfacing in practically all cases include work which is not a proper charge to Account 12. For example, the contract price included the laying of road crossing planks and in no case was any deduction made for this work from the contract costs. Separate prices appear in the contracts for unloading and reloading of material or handling material varying from \$100 to \$300 per mile. No one was offered who was familiar with the actual work contemplated by these separate unit prices, and the

only information is that the combined prices include handling work properly chargeable to the material accounts as well as distributing material on the site of the work. The contract price for placing ballast generally includes the cost of unloading ballast, which is properly chargeable to Account 11. So, in no case do the contract prices reflect the costs proper to Account 12 without resorting to estimated adjustments.

With respect to material yard expense, all of the handling charges which could be found in accounts 8, 9, 10, and 12 were added in to the total and then a deduction made to take care of charges proper to the material accounts. This deduction was built up on the basis that material yard handling would cost 3 cents per tie and 50 cents per ton of rail and track material, the same prices as are used by the Bureau in estimating theoretical reproduction costs. Apparently the only basis that the Pennsylvania has for using these is that they were discussed with a Bureau representative several years ago and everybody agreed that they were fair prices. (Tr. pp. 4939, 4940.) The deductions on this basis range from \$146 to \$174 per mile, depending on the quantities of material in the track. No consideration was given to the manner of handling, which of course would affect the actual costs.

It is too clear to require any extended argument that the result of deductions of theoretical amounts from the total costs of the projects does not give the actual cost of tracklaying and surfacing. In at

least once instance, Bristol change of line (Ex. 291), there was no proof that the contractor was actually paid for handling material at the price set out in the contract, \$200 per mile (Tr. p. 5086), but regardless of this fact the contract price was computed for the whole mileage of track laid by that contractor and the resulting amount added into the totals.

As stated, the contract costs for ballasting include the labor of unloading ballast, and the work-train costs also include the work-train service necessary for that operation. In most exhibits the witness deducted the labor unloading at 3 cents and work-train service at 2 cents per cubic yard, the Bureau estimates for reproduction costs. The witness had no information whatever as to the length of haul by the work train, the equipment used or the manner of unloading, all of which is necessary to be able intelligently to approximate the actual cost of doing the work. He made no investigation to find out these important matters.

It is singular that the Bureau prices are readily accepted when to do so serves the advantage of the carrier. There is no proof that the actual cost of material-yard expenses or unloading ballast on these jobs approximates the reproduction estimates. If deductions are to be made, an amount proportionate to the cost of the specific item rather than an amount having no relation to actual cost should be deducted. Naturally on these unrepresentative projects the costs are likely to be higher

than the Bureau's reproduction estimates. The result of this method is to inflate the amount remaining in Account 12.

The extreme case of making deductions by this carrier is its treatment of turnouts. The contracts provide for a separate price for placing turnouts which range as high as \$150 each. The actual costs were included in the exhibit and deductions made on the basis of the Bureau's prices of \$30 and \$40. There is no excuse for this practice when the actual costs are known.

In most exhibits the witness felt that the total cost of the work-train service had not been included in the recorded costs. The basis for this conclusion is unknown. Large sums were added to supplement this item of expense. These estimates were made by some other employee of the carrier and the witness was unable to give the details.

To the contract cost thus adjusted, large sums were added for work done by company forces for resurfacing and relining. The witness was unable to explain these items and the necessity for the work. It is evident that these cost studies are of little value.

A number of the Pennsylvania jobs are what might be termed "patch work" construction. What new work is included was built in such a way that the construction amounted to the same thing, that is, it was completed in short sections sometimes isolated from one another. The yard tracks presented were constructed over a long period of time with

tracks going into operation as fast as they were completed. There is no project presented which is comparable to construction under theoretical reproduction.

Three of these projects presented to support the assertion that track can be constructed and is constructed for initial high speed prove the very opposite. Exhibits 293, 295, and 301 are claimed to have been constructed for an initial speed of 70 miles per hour. However, in the case of these jobs, as on the other high speed projects presented at this hearing, an inspection of the train orders makes it very clear that operation began at a reduced speed and only after the roadbed had been compacted for a considerable period by the pounding of trains was the scheduled speed of 70 miles per hour permitted. These three jobs also were very short pieces of line revision work on the 4-track main line of the Pennsylvania where there existed the necessity of bringing the track to a condition where it would permit high speed at the earliest possible moment in order not to disrupt fast passenger schedules. We believe that these projects illustrate the impracticability of attempting to reproduce a whole line of railroad for any such high speed. The best argument against the practicability of opening track for high speed is that the railroads never do it themselves except in the case of short pieces of line revision work where there is no other alternative.

Exhibit 289, Atglen and Susquehanna Branch.— This double track freight line was built in sections

by five different contractors. The track runs very close to the Susquehanna River and during construction there was trouble in one or two places because of slipping banks. (Tr. p. 5174.) The witness did not take the trouble to investigate whether or not there was any difficulty from slides or subsidence during the tracklaying period. (Tr. p. 5175.) This failure to investigate conditions surrounding construction is notable in all of his studies. There is absolutely no way of determining what effect the circumstances surrounding the construction of any particular job would have on the costs of that job. For this reason alone it is believed that little, if any, weight can be given to the Pennsylvania cost studies.

Details of the study presented as exhibit 289 were transcribed from the "Blue Book" covering this job, exhibit 302, which the witness could not vouch for. The amounts appearing therein were checked with the original ledger but no such check was made of the *description* of the work. (Tr. p. 5176.) The witness had no definite information as to how material was handled on this project. He consulted one of the engineers who was on the job but the engineer talked in generalities. (Tr. p. 5179.) The witness was perfectly willing to hazard guesses as to any details about which he was questioned, however. (Tr. p. 5179.)

This project was not carried on as one piece of construction. The contracts were let in *nine separate sections* to five contractors and the work was

prosecuted in so many small pieces rather than as one large construction project. It is obvious that the overhead expenses are thereby increased due to the necessity of having five separate and distinct organizations on the job rather than only one. These various sections were completed on the following dates according to the final estimates:

Section	Date of final estimate	Mileage
1.....	Dec. 30, 1905	11.2
9.....	Jan. 31, 1906	8.9
8.....	Feb. 28, 1906	6.6
4.....	do.....	8.0
6.....	Mar. 31, 1906	3.22
3.....	Apr. 30, 1906	8.0
5.....	do.....	4.36
7.....	do.....	7.58
2.....	July 30, 1906	9.50

It will be noted from the above dates of completion that the construction of these sections did not occur in any regular order and it follows that no use could be made of one section in constructing the adjoining one except in one or two instances. Under the theory of reproduction the work would be carried on as one continuous impulse and a more economical use of the track already constructed would be possible. In this further respect, therefore, the Atglen and Susquehanna project is open to criticism as cost data.

The unrecorded costs calculated and included amount to \$4,358 on this project. Approximately \$37,000 is charged for extra work for resurfacing and relining track. This work was all incurred after the contractor who built a particular section

had completed his work and the track had been accepted by the engineer. (Tr. pp. 5196, 5197.) The extra work on section 1 was done by a different contractor from the one who had built the track. Coincident with this extra work in rehabilitating the track are large items for cleaning up slides (which latter are not included in the exhibit). It seems entirely reasonable to assume that this extraordinary amount of extra work was made necessary by the abnormal number of slides occurring in this region. No investigation was made by the witness to determine the necessity for all of these charges. (Tr. p. 5206.) On some of the sections there are no charges for extra work resurfacing and relining, while on sections 7 and 9 for example, there is charged \$12,000 and \$9,000, respectively, for this item. He could not explain the entire absence of such charges on some of the sections and the comparatively large amounts on others.

Both tracks on this project went into service August 12, 1906. The witness could not state positively when the contractors turned over each section. The final estimate for section 1 was rendered December 30, 1905, and final estimates on the other sections at different times thereafter up to June 30, 1906. The witness had no information as to what use was made of the completed track between the time of its completion and the date of operation. (Tr. p. 5190.) Apparently he assumes that because there was no maintenance charges before

August 12, 1906, there was no operation. However, this does not follow because we find on other jobs on the Pennsylvania that construction charges continue until all speed restrictions are removed. Without further information as to the facts the surmise by the witness can not be freely accepted.

The testimony of this witness as to the speed factor is interesting. This track was not built for a 40-mile speed. No speed ultimately to be attained was designated in the authority for construction. (Tr. p. 5189.) The speed for which the track may be used is determined by inspection after the track is built. (Tr. p. 5188.) This appears to be the purport of the witness' testimony though he was reluctant to make a direct answer. It is believed that this is illustrative of the ordinary practice of building track and that the actual speed for which the track is safe, determined after inspection, is ordinarily adopted rather than a speed determined before the construction began.

In connection with this project it is desirable to point out a fallacy which perhaps exists in all the comparisons made between the cost reported by the carrier and the reproduction cost computed at engineering report prices. In most cases the project is but a part of a valuation section and it is improper to apply a unit price developed on a whole section to the quantities existing in a part of that section. No assurance can be had that if only this portion were under consideration as a separate valuation section prices approximating the correct

actual cost would not be applied. The unit prices applied over a whole valuation section are average prices for that section and do not necessarily apply uniformly over the whole section.

Exhibit 290, Atglen and Susquehanna Branch Sidings, P. R. R.—This exhibit includes the sidings on the Atglen and Susquehanna project. The contract price for placing turnouts varied from \$50 to \$150. In deducting the cost of placing turnouts in order to get the per mile price of track, the deduction was made at a price of \$30 for each turnout which is the price used by the Bureau according to Mr. Hultgren. (Tr. p. 5216.) This is but another example of the practice of this carrier (discussed more fully hereafter) in accepting Bureau prices when a deduction is necessary, and it has the effect of leaving in the remaining total cost an amount not representative of the actual cost of doing the work.

Exhibit 291, Bristol change of line, P. R. R.—This is a line change, about 2.5 miles long, in the four track heavy traffic main line between Philadelphia and New York and includes 10.874 miles of all tracks. This revision, in the town of Bristol where the tracks are elevated on embankments and bridges, involved connecting each of the four tracks at both ends with the busily operated main tracks which, at this period, were carrying 78 westbound and 79 eastbound trains daily. (Ex. 444.) Eight such connections in a total length of 10 miles of all tracks undoubtedly operate to increase the cost

above what would normally be encountered in reproduction.

The contract price for tracklaying was \$500 per mile and for handling material \$200 per mile. That the contractor was actually paid \$200 per mile for handling material could not be verified from the ledger. The witness merely multiplied the mileage by \$200 without verification and added that amount to the total cost. (Tr. p. 5086.) A number of separate charges for labor piling material, loading material, and the cost of a temporary material siding, charged on the ledger to the tie and rail accounts, were transferred by the witness to Account 12. (Tr. p. 5091.)

After adding in the alleged costs of handling material, he deducted \$174 per mile for material yard expense without any knowledge or investigation as to the manner of handling the track material. The unit price paid the contractor for ballasting included also the labor unloading and a deduction was made at 3 cents per cubic yard.

As in the case of other exhibits, the witness accepted as correct the items shown in the Blue Book. While the project was completed and placed in operation in November, 1911, all costs of indemnity insurance on this job were charged to Account 12, extending into 1912 and 1914. (Tr. p. 5093.) Track troughs were constructed in each of the four tracks, each trough being about 1,000 feet long and this undoubtedly caused a certain amount of resur-

facing which would not be present in the reproduction of the ordinary line of railroad.

Exhibit 292, Columbia to Rowenna.—This project, about 7.5 miles long, comprising 14.8 miles of all tracks, is a double track freight line and is in reality a continuation of the Atglen & Susquehanna project. The contract price for tracklaying was \$475 per mile, for unloading track material \$165 per mile, for placing switches \$50 each, and unloading and surfacing with ballast 36 cents per cubic yard. Construction began in April, 1905, and the contractor apparently completed tracklaying and ballasting in November, 1905. While the eastbound track was placed in operation December 12, 1905, the westbound track did not go into service until August 12, 1906. The witness had no information as to why the westbound track lay idle for 8 months. Amounts totaling \$4,142.30 for raising tracks, lining and surfacing by company forces were charged during 1906. (Tr. p. 5058.) No information was given as to where this work was done or the necessity therefor. If the work was done on the westbound track, it was undoubtedly occasioned by its disuse and, therefore, more in the nature of rehabilitation than new construction, and if done on the eastbound track which was under revenue operation, it is a proper maintenance charge and as such should be excluded from the study. The witness made no inquiry as to when the first separate charge for maintenance was made to operation. (Tr. p. 5056.)

As in other cases the study is based on the "Blue Book" which has weight only in so far as it is correct, if it is so, and no proof of its correctness has been furnished. (Tr. p. 5073.) The same deductions were made for material-yard charges and for labor unloading ballast at Bureau prices without any information as to actual method of doing the work.

With respect to the work-train service recorded in the ledger all items are charged under the general heading "track" and the only ones bearing any particular description are those for distributing ballast. None of them is described as track-laying. (Tr. p. 5072.) It can hardly be said that the mere appearance of an item under the heading "track" and the absence of any further designation affords conclusive proof that such item is a proper charge to Account 12.

The same method of computing the alleged unrecorded charges for work-train service and deducting for work-train service for Account 11 is followed here as in the other projects. The total amount of work-train costs recorded is \$9,083, from which is deducted an estimate of \$4,500 for that part incident to Account 11. It was assumed that the remainder was insufficient for Account 12 and \$3,484 additional was included, computed in the manner explained in other cases. The witness had very little information as to the details of the work-train costs but used the Blue Book as the basis for assumptions (Tr. p. 5070), and made no

investigation as to the manner of construction or what the work train was doing. He did not attempt to consult the underlying details back of the ledger entries or the engineer in charge of the work. (Tr. p. 5074.) An examination of a copy of these ledger sheets will show the scanty information available. (Ex. 292.)

Exhibit 293, Duncannon to Aqueduct.—This exhibit covers a 4-track line, revision job 3.03 miles long, built to eliminate grade crossings and to improve the alignment of the track in the town of Duncannon and includes 12.10 miles of all track. The new line parallels or perhaps crosses the old line for a part of the distance. (Ex. 293a.) The witness thought that the new line was right up against the old track and the center lines of the 4-track roadbed might intersect at several places. (Tr. p. 4996.) Each track was opened for operation in various sections at different dates. (Tr. pp. 5009, 5010.) A number of temporary connections with the busily operated old line (Tr. p. 5008) must have been required in addition to the permanent connections at either end of the new work, all of which would have an influence in increasing the cost beyond normal. This project also includes some "throwing track." (Tr. p. 5003.)

The study was prepared by the witness from the Blue Book (Ex. 303) and the ledger costs were not consulted any further than to check the amounts. As an illustration of the acceptance of the costs shown in the Blue Book without investigation, pay-

ments described in the ledger as "unloading material" have been carried into the exhibit under the description "track material unloaded and distributed." This change in description was made in transferring the item from the ledger to the Blue Book, and the description was not verified in compiling this exhibit.

Justification for this change in description is not apparent inasmuch as the logical meaning of the description in the ledger is that it covers the unloading and handling at the material yard as contemplated in the contract covering this project, entirely material charges, whereas the changed term would imply that part of the charge was proper to Account 12. Another instance of a change in description in transferring an item from the ledger to the exhibit is a charge for "labor throwing," \$473.25, restated in the exhibit as "lining and surfacing." The fact that the description of items in ledger was not verified (Tr. p. 5012) shows carelessness in the preparation of the studies. (Tr. p. 5022.) "Labor throwing" is ordinarily an operating charge and as such is improperly included in Account 12. It would seem that the true record should be put before the Commission rather than an interpretation made by a man who knew nothing about the facts. The witness merely assumed that the above-mentioned work was within the limits of this project and, therefore, should be included.

The contractors received materials in cars from the carrier at the nearest accessible point to the

work. (Tr. p. 5004.) The amounts paid the contractors include, of course, the material yard costs proper to other accounts, and labor unloading ballast. The same adjustments were made in this exhibit for Account 11 charges and for material yard charges as on the other projects, although nothing was known of the manner of unloading or the manner of handling material. (Tr. p. 5010.)

The witness was unable to say how the total charges for work-train service were computed, whether the amounts shown are actual costs or the result of some arbitrary proration. (Tr. p. 5024.) He did not know what the work-train was doing and did not investigate to see whether the sum charged represented the total cost of work-train service on the job. (Tr. p. 5024.) He computed that the work-train was on the job 137 days, although he did not know whether the work-train reports were in existence or not, from which the exact information could be obtained, and decided that the recorded costs for work-train service were incomplete and a sufficient amount was added to such reported charges to bring the expenses up to \$50 per day, or a total addition of \$4,891. The \$50 per day charge was developed from a study of the Atglen & Susquehanna Branch by a former employee of the carrier, and has been applied to the jobs in this presentation regardless of the different conditions existing and, indeed, in entire ignorance of what conditions actually were on the various jobs. No details of this study of work-train expense were known to the witness

(Tr. pp. 5028, 5029) and the amount was not tested by comparison with any other job.

Although the contracts provided that the contractors would maintain the track until accepted (Tr. p. 5004), the sum of \$6,205 was added for lining and surfacing tracks most of which was done by company forces. Some of these items were merely *assumed* to be resurfacing as there was nothing in the ledger except a charge under the heading "track" (Tr. p. 5019), and this was all the information the witness possessed as to these items. The line went into operation at various dates from June to September, 1902, and the greater part, if not all of this amount for extra work, resurfacing, etc., was work done after operation began. In fact one item is specifically set out as covering "extra work on new track at Aqueduct after it had been turned over to division, \$4,902.22." (Tr. p. 5019.) It is quite apparent that relining and resurfacing was necessitated by the operation of trains over this track and as such would be a proper charge to maintenance. Large amounts are included for company work lining and surfacing with no information as to where the work was done. (Tr. p. 5023.) It is reasonable to assume that the large amount of company labor resurfacing after June was expended on the operated tracks. Although the carrier can not prove that this work is included in the new construction, the Commission is asked to *assume* that all of this additional work was done on

this job even though it is supposed to be covered in full by contract payments already made.

Exhibit 294, Glen Loch to Thorndale.—This is a double-track freight line about 10 miles long, with 20.33 miles of track and 15 bridges, the largest of which is 1,451 feet long. As on other jobs, the witness was without information as to the manner of construction or the details of the charges. The work was done under four separate contracts and was divided into seven sections. These different sections were completed at various dates and parts of the line lay idle for many months. One contractor commenced tracklaying 5.5 miles in January, 1905, and completed the ballasting in June, 1905; another commenced tracklaying of 3.8 miles in April, 1905, and completed the ballasting in July, 1905; a third commenced the tracklaying of his section of 2.5 miles in June and completed the ballasting in September, 1905; and the fourth began the tracklaying of his 8.5 miles in September and completed the ballasting in December, 1905. For some unexplained reason these sections remained idle until April, 1906. Here again we have piecemeal construction and the necessity for rehabilitating the track first completed before it could be used for revenue operation. The project was placed in operation as a whole on April 11, 1906.

There has been added to the costs of construction about \$17,000 for relining and resurfacing tracks, maintaining tracks, repairing tracks, etc., and the greater part of these expenditures were made in

April, 1906, after the new tracks had been idle for months, and immediately prior or subsequent to operation. No witness was offered who could explain these items. We must assume that this work was necessary to resurface tracks that had already been surfaced many months before. Of this amount \$8,732 was for "relining" or "resurfacing," \$2,730 for use of engine and crew, and \$613 for timekeepers and office expenses during the month of April, 1906. Other items for maintaining track after completion of construction are also in the same class.

The contract costs include material yard charges and unloading ballast not properly chargeable to Account 12. There was also included a total of about \$1,500 for unloading, piling, and storing track material. The deductions for material yard charges, labor cost of unloading ballast, and work-train service were made in a manner which has already been explained. The only information as to any of these handling charges is contained in the ledger sheets introduced as Exhibit 294-b and inspection of these develops that the information therein contained is indeed meager. There was added \$3,462 for the estimated cost of work-train service not included in the recorded costs. The manner of computing work-train expenses seems open to question. Although the construction took place during the years 1905 and 1906, the addition made to take care of unrecorded work-train charges is built up on 1914 costs. (Tr. p. 5159.) As previously mentioned,

this computation of work-train charges is based upon costs developed on the Atglen and Susquehanna branch and is applied without any regard to particular conditions affecting the job under consideration.

Amounts aggregating \$1,241.85 are included for work-train service in the years 1903 and 1904 prior to the beginning of tracklaying work. (Tr. p. 5165.) The explanation given was that material was concentrated on the job before tracklaying began. (Tr. p. 5165.) This information was obtained from an engineer three or four years ago. (Tr. p. 5170.) This one isolated detail of the manner in which the construction was undertaken is all the information the witness had as to the manner of construction. (Tr. p. 5169.) The witness did not know whether this project had been authorized at the time these charges were incurred and could not state positively whether the material was actually used on this job at all. (Tr. pp. 5168, 5169.)

Exhibit 295, Granville Bridge to Mayes Bridge.—This line-revision job about 2 miles long on the 4-track main line of the Pennsylvania between Harrisburg and Altoona includes only 9 miles of all tracks. It is connected at both ends with the operated track and the cost of cutting in the new tracks to the busily operated line would be extremely expensive. This is borne out by the items shown on sheet 8 of Exhibit 444 (Supplementary information) showing a charge in April, 1906, for "preparing and cutting track into service \$3,-

790.19." The track to which this charge referred cannot be definitely determined but it can apply only to two tracks because tracks 1 and 2 were in service prior to January. This amount, therefore, represents only a fraction as far as can be learned of the total expense of connecting the new track with the operated track and presents one further illustration of the excessive cost of this kind of work.

The orders between January and April, 1906, placing the track in operation required that speed be reduced until the track settled. (Tr. p. 5039.) Although in the Blue Book (Ex. 303) there appeared a statement to the effect that speed restrictions were removed in May, 1906, the witness was unable to verify the statement from the records and could find no information on the subject (Tr. p. 5048). All the charges up to May, 1906, have been included in the exhibit. (Tr. p. 5048.) As the contract costs cover material yard expense and the cost of unloading ballast, the carrier attempted the usual improper adjustment for those items by deducting those charges at Bureau prices. Witness Hultgren was uninformed as to the manner in which material was handled or as to how the ballast was unloaded on this project. To the contract costs, there was added a sum of about \$13,000 for resurfacing and relining tracks by company forces most of which are operating charges, and for making connections with operated track.

For example, an item of \$377.95 covers the expense of raising tracks east of Granville Bridge at a point which is entirely outside the mileage of this study. (Tr. p. 5041.) Other items described as "labor resurfacing new No. 1 and No. 2 tracks after same were placed in service," \$951.22 and \$1,549.94, have been carried into the study. (Tr. p. 5041.) Another item of \$6,744.36 is charged in April for raising, relining, and resurfacing new tracks Nos. 1, 2, 3, and 4. (Tr. p. 5042, Ex. 444.) The greater part of these costs must have been incurred in taking care of current maintenance after commercial operation had begun and as such should be excluded from the total.

This exhibit, like most of the others on the Pennsylvania, is based on Exhibit 303, the "Blue Book," which the witness was not able to support. In transferring the entries from the ledger to the exhibit by way of the "Blue Book," a change has been made in the description so that charges for "track material unloaded" on the ledger read "track material unloaded and distributed" on the exhibit. (Tr. p. 5039.) The witness checked the amounts of money with the ledger but did not verify the description of the work. (Tr. p. 5040.) The original description "unloading material" leaves no room for doubt that the entire amount is improper to Account 12.

Exhibit 296, Newfield Branch.—This is second-track construction of part of the electric line between Philadelphia and Atlantic City. The number

of trains daily over the first track varied from 22 to 46 at different seasons of the year. (Ex. 444.) The witness was wholly without information as to any details of the construction. (Tr. p. 5098.) Although the track was completed in June, 1906, it was not turned over to the operating department until October, 1906, and no information was obtainable as to the use made of the track between June and October.

Of the total reported costs of \$85,436, over \$31,000 is for resurfacing and relining work done by the company forces after the contractor had left the job and presumably had completed construction. About one-half of this amount, or approximately \$16,000, was incurred prior to October, 1906. (Tr. p. 5103.) The remaining \$15,000 was incurred between that time and May, 1907, after the road had been placed in operation. The witness had no information whether any operation took place over the track before October, 1906, and could not state when the regular section gangs were assigned to the track, and consequently when maintenance was first charged to operating expenses. With such sparse information as to a substantial part of the total cost it is difficult to see how any reliance can be placed on this job as useful cost data.

Nothing was known about the length of haul by the work trains in handling the ballast, (Tr. p. 5098) nor how the ballast was unloaded. Substantial amounts incurred both by the contractor and by company forces definitely described as "unload-

ing ballast" have been included in the total cost. Then the usual deductions of 2 cents per yard for work-train service, and 3 cents for labor were made for unloading ballast. (Tr. p. 5102.) In this connection, the minimum amount used by the Bureau in estimating cost of work-train service for ballast haul is 5 cents. In like manner a deduction was made from the costs for material yard charges at the rate of \$150 per mile, although the witness had no knowledge as to the manner in which the material was handled. It seems too obvious to require any extended argument that the methods used by this witness in presenting his costs fail to give any substantial guarantee of their correctness, and that no reliance can be placed upon them.

Exhibit 297, Northumberland Yards.—Construction on this yard, comprising 7 miles of main and 67 miles of side tracks, adjoining an existing operated track, began in the latter part of 1909, and was completed during 1911. No investigation was made as to the manner of construction as the witness did not regard that important. Apparently the yard as a whole was placed in service August 6, 1911, but the witness did not know whether any of the tracks were in service before that date nor when the main track included was placed in operation. (Tr. p. 4961.) Under the contract prices the contractor unloaded and rehandled track material and also laid and took up temporary tracks and furnished work-train service. (Tr. p. 4963.)

This job presents a more extreme sample of his treatment of the cost of turnouts. There are 392 turnouts on this job and they were laid at a contract price of \$75 each. Ten of them are on main tracks and 382 on side tracks. In order to get the cost of straight-line construction an amount for placing turnouts was deducted. But instead of deducting the amount actually paid for this work, \$75 each, a deduction was made on the basis of the Bureau figures, i. e., \$40 for main-track turnouts and \$30 for side-track turnouts. As a reason for adopting this practice he assumed that the price of placing turnouts was out of line with what the costs should have been. (Tr. p. 4976.) The actual costs for placing turnouts were \$29,625, which was added to the reported cost and only \$11,980 deducted. This computation results in a very large inflation of the tracklaying price, about \$17,500, or nearly \$250 per mile. Yet counsel for the Interveners passes very lightly over any defects in their data, characterizing them as "minor." (Br. p. 34.)

The witness omitted to deduct material-yard expenses for handling switch ties, which, computed at Bureau prices, amount to \$1,307. (Tr. p. 5105.) Although this error was admitted, no effort was made by the Interveners to make a correction in the amount included in their summaries. In a somewhat similar manner the costs proper to material yard handling were deducted. We have already mentioned that the contract provided a sepa-

rate price of \$250 per mile for unloading and rehandling track material. On the ledger these costs were charged to the material accounts; 45 per cent to ties, 45 per cent to rail, 5 per cent to frogs and switches, and 5 per cent to track fastenings.

The witness for no apparent reason, about 6 months prior to the hearing, transferred all of these contracts items, which are clearly material yard costs, to Account 12, in the amount of \$18,500, and no items covering material yard charges were left in the material accounts, although he had no information as to the work done by the contractor under this contract provision (Tr. p. 4968) and made no investigation. In order to eliminate the improper charges for material yard handling he made a deduction at the rate of \$146 a mile, the theoretical price used by the Bureau, instead of the actual cost. This deduction amounted to only \$10,822.50. Obviously this procedure is entirely unwarranted, and can only have the effect of inflating the Account 12 cost. His only justification apparently was that he regarded these prices as being a fair price for material yard handling, and that these prices had been approved by the Bureau. But the letter from a Bureau accountant, upon which he relied, expressly stated that the accountant found no equitable basis for making a deduction for material yard costs, and did not approve the method followed by the witness. There was also deducted the contract price of \$750 for laying 1.5 miles of track as this mileage was not included in the study but apparently no deductions

were made for any of the other costs incurred for this piece of track.

The contract price for placing ballast included the labor of unloading and the usual deduction of 3 cents was made. This is a theoretical price used by the Bureau, and may have no relation whatever to the actual cost for that service on this particular job. It would seem important in determining upon the amount to be deducted for unloading ballast for the witness to make some investigation as to the type of equipment used and the manner in which the work had been performed, but this was not done. Furthermore, he stated that he was not interested in the matter (Tr. p. 4988), and that it would not make any difference to him whether or not it had been unloaded by hand. (Tr. p. 4987.) The contract apparently provided that the contractor would furnish his own work-train service. (Tr. p. 4963.) However, no deduction was made from the contract price for work-train service incident to hauling the ballast from the point of delivery to the contractor to the place of unloading.

In addition to contract costs, the reported cost includes the sum of \$26,165 for lining and surfacing track by company forces after the contractor had completed the work. The major portion of the lining and surfacing, or maintenance, was done by company forces between January, 1910, and August, 1910. The only definite information with reference to operation was a note from the superintendent that the yard was placed in service on

August 6, 1911, but the witness did not know whether or not it had been placed in service in various parts at prior times. The tracks were either placed in operation as completed and this work was in connection with the maintenance, or, if the tracks were not placed in operation until the whole was completed in August, 1911, the maintenance was necessary to keep the tracks in condition for over a year, while they were idle. Apparently some of this large amount was for work on the existing operating track. For instance, in the month of January it is admitted that the sum of \$1,614 covered lining and surfacing the old main track under operation. (Tr. p. 4982.) The first reference to surfacing work, especially on new tracks, was in May, 1910, while many of the items, large in amount, bear no description and there is no evidence as to where the work was done.

Exhibit 298, Pitcairn Yard.—This project includes 34.9 miles of yard tracks, the need for which was urgent, (Tr. p. 5107) and was under construction from January, 1906, to 1909. (Tr. p. 5109.) All the tracks in this yard are laid on an 8 to 10 foot embankment. It is reasonable to expect that subsidence would be encountered over so large an area of embankment, (although the witness professed ignorance of any such occurrence) and this undoubtedly would tend to increase the surfacing costs on this project. He was unable to state the number of connections made with the main track under operation or whether any work was going

on on either of the main tracks during this period.

One hundred and fifty-seven turnouts were laid in this yard at a contract price of \$50. In this case he departed from the practice on other projects and did not include the total price paid under contract, later deducting a lesser amount estimated on the bureau basis. However, he failed to make a deduction for material yard expenses on switch ties in connection with these turnouts. (Tr. p. 5112.)

The usual manner of attempting to eliminate charges improper to Account 12 was made by deducting material yard costs at Bureau's prices of \$152 per mile and labor unloading ballast at 3 cents. The difference between the engineering report price in this project and the reported costs as adjusted is undoubtedly due to the faulty method of treating the ballast. The engineering report price for track-laying considerably exceeds the actual costs for the same work, but the reported costs for placing ballast as adjusted is \$65,947 as compared with the total price for placing in the engineering report of \$31,142.

Exhibit 299, Cape Junction to Kiptopeke.—This project comprises 9.66 miles of track, of which about 6.9 miles was built in 1910 and placed in service on December 1, 1910, and the remainder of about 2.7 miles was placed in operation on March 18, 1912. The total reported costs for both sections is \$12,165, of which \$9,612 is for the first section and about \$2,550 the second section.

For the portion built in 1912, approximately 2.7 miles, no details whatever as to the costs or construction were available. The information furnished in this exhibit was taken from the "Blue Book," and Witness Hultgren could not state whether detailed records were available when the Blue Book was compiled. He did not know whether the 1912 portion of the line was built by contract or by company forces or even when it was built. (Tr. p. 5128.) The incomplete nature of the information upon which this study is based is clearly evident.

The first section was constructed under contract which provided that the contract price for track-laying of \$1,000 per mile would include the unloading and rehandling of all track material, lining and surfacing and ballasting with dirt, the contractor furnishing his own work-train service. The contractor was paid \$6,900 on November 30, 1910, for 6.9 miles of track laid and surfaced. There has been added to this cost about \$2,712 for extra work done by the contractor, making the total cost of this section \$9,612. To support the extra costs the witness had the vouchers which are in the record as exhibits 299b to 299d, inclusive. Nothing was known as to the manner in which the work was done. (Tr. p. 5128.)

This is the only instance in the case of the Pennsylvania where the underlying details were furnished back of the lump sums stated in the ledger and illustrates the importance of inspecting the de-

tailed charges. In the other exhibits, where so little information was available, it is evident that no accurate conclusions can be drawn as to the reported costs. Of the extra work of \$2,700, \$223.30 was for the removal and replacement of a connection with a siding caused by a change in location and in removing ties at two other points; \$2,010 for extra rehandling of ties at \$167.50 per mile to place the ties in a certain manner due apparently to a change decided upon after the track was laid; and \$189.75 for relining and resurfacing caused by delay in constructing telegraph and telephone lines. These extra bills are in the nature of duplications of costs already included and although they are proper Account 12 charges, would not be proper costs in reproduction. The remaining items are amounts paid the contractor for counting and checking ties and not proper to Account 12. (Ex. 299b to 299d.)

The contract provides that the contractor for the unit price of \$1,000 per mile should unload and handle the material. No deduction, however, was made for that service. Apparently there are no charges for placing ballast included in the costs, but obviously there was some change in the contract provision in that respect, as the contract provided that the unit price should include the surfacing and ballasting with dirt. We have no information as to the facts, but it may well be that the placing ballast is included in the contract price for track-laying.

Exhibit 300, Possum Glory Branch.—This job was built in two sections; 7.445 miles in 1904 and 1905, and the remainder, a short extension of 1.554 miles, in 1912 and 1913. Substantially all the work of tracklaying, surfacing and ballasting was performed by contract, and the contract prices include also the material yard expense and labor unloading ballast. As in the case of the other jobs, witness Hultgren attempted to deduct the charges which are improper to Account 12. To the contract costs, there was added the cost of work by company forces for lining and surfacing tracks as well as work-train service furnished.

Mr. Hultgren was absolutely without any information as to the manner in which the track was constructed or any of the details surrounding the work and had no information with respect to the details of the cost. (Tr. pp. 4915-4916.) He made no inquiries as to the manner of handling the material; (tr. p. 4918), and made no investigation to find out how the work was performed (Tr. p. 4919), although he attempts to make deductions for what in his opinion should be the proper cost to other accounts.

The costs for the 1904 construction were kept entirely separate from the 1912 construction, and the reason for combining these costs is not known. The cost for the 1.5 miles constructed in 1912 was \$5,574 as compared with the book costs of \$19,977 for the 7.5 miles previously built, or approximately a per mile cost of 50 per cent more for the shorter con-

struction. The effect, of course, of including this additional construction is to increase the unit cost.

The first section was placed in operation on May 29, 1905, and there are included expenses for maintaining track by company forces of \$1,106, a good part of which was done after operation began. (Tr. p. 4952.) This seems clearly a proper charge to operating expense and, therefore, should be excluded from the study.

The cost of tracklaying and surfacing on that portion of the job built in 1912 and 1913 is accounted for in full by payments under the contract, yet his cost study includes an additional amount of \$1,955.33 for company labor in laying, lining, and surfacing tracks. In setting up this amount, he apportioned one-half as "laying" and one-half as "surfacing," although the full mileage laid of 1.54 miles had been paid under the contract price. (Tr. p. 4929.) The witness thought, however, that the description "laying" might be a misnomer, and that the total sum was proper for surfacing. Although he had no information as to what work was actually done for this money, nor when this section of the line was placed in operation, he had no hesitation in including the total amount in the study. (Tr. p. 4933.) Why it should be necessary for an expenditure of this size to be made on 1.5 miles of track which had been completed in all respects by the contractor is far from clear. The inability of witness to offer any explanation for this and similar

items throughout all of his projects vitiates these projects as cost data.

The actual cost of placing turnouts is recorded at a contract rate of \$75, and in order to obtain the cost of tracklaying and surfacing on the straight mileage basis without the inclusion of specialties the cost of turnouts was deducted at Bureau prices. The reason advanced for such an unusual procedure was that he thought there was an unbalanced bid. (Tr. p. 4951.) There is no justification whatever for such a procedure if the cost data are to be regarded as in any way reliable.

As in other instances, deductions were made for material yard expenses and unloading ballast at Bureau prices. The effect of such a method is that the other accounts on these unrepresentative projects do not bear their proportion of the excess expenditure, but all of excess is thrown into Account 12.

The witness had no information as to where the work train received the ballast cars and, therefore, knew nothing of the length of haul (Tr. p. 4919); but he thought that the ballast would be picked up at the junction point with the existing line and from there hauled by the work train. (Tr. p. 4913.) The total charges for work-train service on this project were approximately \$6,000, and this apparently was the entire cost of work-train service on the job while tracklaying was going on. (Tr. p. 4819.) It would seem reasonable to assume that there was other work done during this

period for some of the other accounts. From this amount the witness deducted the small sum of \$422 as being that part of the work-train service properly to be allocated to Account 11 for hauling the ballast cars and unloading them. It may safely be said that there were several times as many cars of ballast handled as there were track material, whereas approximately \$5,500, of a total of \$6,000, is charged to Account 12, or well over \$600 per mile. This allocation on its face is improper.

In this connection the contracts specifically provide that this contractor would furnish his own work train, unless the company in writing agreed to do so. There is nothing in writing which revokes this part of the contract, nor has the witness made any investigation to determine whether or not this cost incurred by the company was refunded by the contractor.

Exhibit 301, Carlisle to Greason.—This line revision, covering 9.48 miles of main track and 2.2 miles of passing siding, eliminates an "S" curve and crosses the old line in the middle at two different points. (Exhibit 301a.) Some change in grade was also involved. (Tr. p. 5131.)

The new track was placed in operation in sections at various times from November 1, 1910, to March 13, 1912. (Tr. pp. 5131 to 5138.) A great number of connections with the operated line had to be made under traffic, which undoubtedly operate to increase the cost of this construction abnormally. Apparently complete operation began March 14, 1912, but

Account 12 charges run until September, 1912, nearly 6 months after the beginning of operation.

No details of the construction were known to the witness. The work was performed by company forces entirely. The costs in this case were developed in a little different manner from other exhibits, and were worked up by the witness from the foreman's monthly reports which covered maintenance work as well as construction work done by the same gangs. (Tr. p. 5141.) The witness in compiling his exhibit merely went through the foreman's reports and selected items from them which he thought were proper charges to Account 12. (Tr. p. 5145.) He did not inspect the time books showing the description of the work performed. The charges on these monthly statements were to additions and betterments and not to the accounts in the present classification of accounts. It is apparent that compilation of costs made in this manner with no further information than the meager details shown on these monthly statements, without recourse to the underlying details and by one not familiar with the work many years after is entitled to little weight. Moreover, as we have pointed out the costs are included for work several months after the line as a whole was in operation and the record is silent as to the amount expended prior to March, 1912, on the tracks already in operation.

A job of this nature involving line revision and grade changes, requiring a number of connections

with an operated track, and placed in operation at various times as parts of the work were completed, is certainly far removed from conditions which would be encountered in a theoretical reproduction. Coupled with the complete absence of any detailed information as to how the work was done, these facts seem to destroy the utility of this project as a guide to the normal cost of tracklaying and surfacing.

ERIE RAILROAD

Exhibit 304, Uniondale to Simpson.—This project consisting of 7.98 miles of second main track and 1.023 miles of side track was constructed adjacent to the heavy traffic main line of this carrier. The data on this job was originally compiled at the request of the Presidents' Conference Committee in 1921 at which time the witness examined the original time-books and made various changes in the distribution of the cost. In 1925 an attempt was made to get a detailed description of the charges from the same records, but it was found that they had been destroyed by fire. (Tr. p. 2416.)

On this project the reported costs are \$31,612 as compared with the engineering report prices of \$18,844. The charges are shown in lump sums for each month with no underlying data available. In spite of this, the Interveners present these data and ask that they be given full weight. The work was performed by maintenance forces who were engaged in maintenance work as well as the new con-

struction work and we have pointed out the obvious difficulty of separating accurately the costs of construction from operating expenses.

Construction commenced in March, 1913, and the line was placed in operation as a whole in October, 1913. The second track had been connected with the operated track at various points as fast as it was completed. (Tr. p. 2425.) Inasmuch as the existing track was handling a great amount of traffic at this time, the cost for making the various connections must have been extremely high. The witness thought the first charge to operating expenses for maintenance was in November. (Tr. p. 2425.) It would seem that the charges for maintenance of the section already under operation are included in this study.

It is obvious that no weight can be given to costs unsupported as these are. In view of the nature of the work the costs, even though accurate, are not representative of ordinary reproduction conditions.

PHILADELPHIA AND READING RAILROAD

Exhibit 305, New York Short Line; Cheltenham to Neshaminy Falls.—This is a new double track cut-off built to improve the alignment and grade on the main line of the Reading. The carrier has no time-books or original records except copies of auditor's bills which formed the basis of the exhibit. The payrolls are not sufficiently detailed to enable a check of the distribution to be made. Any

investigation behind the amounts set out in these bills is impossible although there are some items which appear on inspection to be at least very doubtful. The Commission should not be asked to accept at face value costs which thus defy investigation.

To illustrate the importance of being able to verify items: An amount of \$17,660.30 has been included in the total, with no description other than "roadbed and track." What this large sum was spent for is left solely to the imagination. In addition there is charged \$12,064.75 for "ballasting" and \$12,306.99 for "surfacing." Whether any of the \$17,660.30 for "roadbed and track" covered work properly chargeable to Account 12 can not be verified. Records so vague and indefinite where there is no possibility of verification can not be accepted.

In spite of the lack of information in the records the witness has not hesitated to make interpretations and transfers. Bills Nos. 2, 3, 4, and 5 (sheet C of exhibit) which were charged contemporaneously with the work to Account 8, have been transferred by the witness to Account 12. Some of the material was unloaded at the ends of the new work and distributed ahead by train. Bills Nos. 2, 3, and 5 merely show "unloading material," and may apply to labor unloading material in these temporary material yards and are probably proper charges to Account 8 as originally made. Why the

witness should consider that he is better able to make proper allocations than the man on the job is difficult to understand.

Many of the original charges to Account 12 are wholly without description and there is no possibility now of verifying the accuracy of the original distribution to Account 12. For example, on sheet 10 of the exhibit there is an item of \$801.01 with nothing to show what work it represents. (Tr. p. 2527.) Sheets 13, 14, 19, 21, and 28 show items for team hire with nothing to prove what these teams were used for. An item on sheet 16, piling ties, may have been a material yard expense. An item of labor, \$863, on page 34 of the exhibit is wholly without description.

Work train service has been divided between Accounts 11 and 12 in proportion to the amount of labor required for distributing track material and ballast. There is no showing as to the number of cars of track material delivered or the time required for unloading cars of material as compared with cars of ballast. The computation does not purport to be anything more than an estimate.

The inadequacy of the cost records on this job is further illustrated by the impossibility of segregating the costs after operation began. There was no way of separating maintenance costs between May 27, the date of operation, and June 1, and costs for these 5 days are included.

BUFFALO, ROCHESTER AND PITTSBURGH RAILWAY

Exhibit 308, Indiana Branch, Cloe to Ernest.

Costs to Account 12 on this project run from September, 1902, to December, 1904, but only five days of track work were performed prior to February, 1903. Beginning in May, 1903, work trains on their way to the material yard out on the main line picked up cars of coal and hauled them over the new construction to the main line. (Tr. p. 2688.) Originally, revenue received for the handling of coal in this manner was credited to Account 12, in the amount of \$4,994.32, but in the exhibit this credit has been removed, while the costs of maintaining the track and operating the train which handled the coal traffic remain in the exhibit. The fact that the expense of operating this coal train remains in the total cost should be enough to discredit it as cost data. Regular operation began on August 1, 1903, but construction charges run to December, 1904. (Tr. p. 2793.)

This exhibit typifies the attitude of many carriers in making transfers to Account 12 purely on assumptions. A total of \$13,507.37 has been transferred to Account 12. This amount was originally charged to the material accounts but the witness assumed that all charges for handling material were incurred on the site of the work, and therefore that the handling was proper to Account 12. (Tr. p. 2684.) He has no basis for this assumption, and there is nothing to show that the original distribution was incorrect. The quantities of ballast and

ties shown in the exhibit are quantities required for the carrier's standard track section and were estimated because there was no record of the quantities actually installed in original construction.

This study was made over 20 years after the work was performed. Bills and payrolls showing the total cost were available, but there was no information describing the nature of the work which is necessary in order to make a proper distribution of costs. The best that can be said of this exhibit is that it merely reflects the opinion of the witness based on fragmentary data.

Exhibit 309, Indiana Branch Extension, Ernest to Josephine.—This project was constructed immediately after the one included in Exhibit 308. Operation began July 1, 1904, but the witness did not know whether any charges for maintenance were made to operating expenses for the months of July, August, and September, 1904. (Tr. p. 2781.)

A total of \$4,390 has been transferred to Account 12 from other accounts. Most of this sum was originally charged to the material accounts and was transferred by the witness on his assumption that all handling charges were incurred at the site of the work and not at the material yard. (Tr. p. 2784.) Nothing in the description of the items in question justifies a transfer to Account 12.

Whatever costs were incurred for the unloading of ballast, a proper charge to Account 11, are included in the amount set up in the exhibit for Account 12. The failure to make any deduction was

based on the assumption that no labor was required to unload ballast from hopper-bottom cars. (Tr. p. 2703.)

This study was developed under the same conditions and with no more data available than on Exhibit 308, the distribution of charges being based more on the opinion of the witness than on any actual knowledge.

Exhibit 310, Clearfield and Mahoning Railway.—

This project was built in 1892 and 1893. About one-third of the track was laid by contract and the remainder by company forces, but no record is available showing how much work was done by either. The exhibit shows that ballasting was practically completed before the beginning of operation. However, charges subsequent to the date of operation are included in the exhibit. Many of these items are charged to the account "tracklaying" but there is nothing whatever to show what work was done. This fact alone makes the costs set out here open to serious question.

Information as to the ballast quantities actually inserted during original construction was not available and the amount shown in the exhibit is the quantity required for ballasting the track to a depth of 10 inches below the ties. (Tr. p. 2825.) An arbitrary separation between the cost of unloading and placing ballast was resorted to in the absence of any definite records. (Tr. p. 2805.) About \$28,000 was charged on the books for "stone ballast in place" at \$1.00 per cubic yard. The witness

deducted 25 cents per cubic yard for unloading and included the remainder amounting to about \$21,000, for placing ballast in Account 12. He did not know whether this \$1.00 per cubic yard covered the production and hauling of the ballast as well as the unloading and placing. The more reasonable assumption is that the \$1.00 price covers production also, and if this is the case this estimate is erroneous. (Tr. p. 2820.)

CHESAPEAKE AND OHIO RAILWAY

Exhibit 320, Beaver Junction to Wayland.—

Track work on this project, 20.74 miles long, commenced September 3, 1913, and the skeleton tracklaying was substantially completed January 9, 1914. The entire project was placed under operation June 1, 1914, but no separate charge for maintenance was made prior to June 14, 1914, although freight was hauled by work trains as early as January, 1914, and there probably were other revenue trains run over the road prior to June 1 which are not recorded in the force reports. (Tr. p. 2626.)

The rail and fastenings used on this project were mostly relay material. From an examination of the reports it would appear that a great deal of sorting of this material was done at the front. Ordinarily such work would be done in a material yard and would be a proper charge to the material accounts.

It was impossible to separate Account 11 and Account 12 charges for work-train service on the orig-

inal records and the amount proper to Account 12 has been estimated in a most arbitrary manner. Whenever the majority of the work seemed to be hauling ballast, the witness allotted the work-train charges to Account 11 and when the majority of the work seemed to be tracklaying and surfacing, he allotted the work-train charges to Account 12. (Tr. p. 2638.) This method ignores the fact that the work done in spiking, bolting, or surfacing track, etc., can not serve as a guide to the distribution of work-train service. Ordinarily no work-train service is incurred in connection with such work, yet the witness has assumed full work-train service on days on which only work of this nature was done. The function of the work-train properly chargeable to Account 12 is the distribution of materials. The witness admitted that some items of a doubtful nature were included in this exhibit but thought they were counterbalanced because some work chargeable to Account 12 *may have been* deducted. (Tr. p. 2643.) He could point out only very few items which would fall in the latter category.

An excessive amount of overhead expense seems to find its way into Account 12. Although very little work was done on certain days, the cost of foremen, timekeepers, etc., continues throughout the work and was distributed between Accounts 11 and 12, according to the kind of work being done on a particular day. For example, on October 1, 1914, the force was composed of 3 foremen, 5 men, and

two cooks, but all the overhead expense and all the work-train expense was put into Account 12 because only tracklaying work was being done that day. The methods resorted to in this case illustrate the difficulty of examining records many years old in an attempt to pick out accurate costs. The result can be nothing more than a guess.

Rental has been charged at \$15 per day for locomotives and 50 cents per day for cars. These are the rates prescribed by the C. & O. for locomotives and cars rented to private individuals and firms. (Tr. p. 2618.) Undoubtedly this charge includes an element of profit to the company which is not proper in the construction account.

Exhibit 321, Buffalo to Elkhorn City.—This project is a branch 75.98 miles in length which runs through a rather mountainous country. There are 21 steel or concrete bridges, 22 pile and frame trestles, and a tunnel which, including the approaches, is 1,300 feet long. (Tr. p. 2753.) Sixty-five and eight-tenths per cent of the line is curved. There was considerable money spent in moving slides on this project and some subsidence in the roadbed was encountered. (Tr. p. 2752.) These conditions undoubtedly occasioned a large amount of resurfacing and relining and explain some of the large charges for company-force work.

This line was opened for commercial operation in sections at various dates. Substantial charges were included for company force work after a large part of the line was in operation. The witness was

unable to state whether these charges included any of maintenance expenses on the operated portions (Tr. p. 2710.) No definite information was available as to the date of the first revenue train on any of the sections. A number of items described as "maintenance" are included in the total cost, with no possibility of determining whether or not any of this work was expended on the track already under operation. (Tr. pp. 2717-24.) Some of the maintenance was definitely known to be on the completed track. (Tr. p. 2724.) Between April and August, 1905, \$20,126.74 is charged for "maintaining track." No satisfactory data on these costs could be obtained from the force reports because they describe the work only in a general way. (Tr. p. 2705.) There was no description of the work covered by any of the company pay rolls.

There were no data as to the cost of rental of equipment properly chargeable to Account 12 on this job. The witness took the number of work-train days estimated for Ex. 320, above, and applied it to this project in direct ratio with the mileage of the two jobs. There is of course no warrant for any method such as this. It merely makes the estimates cumulative, and we have shown the erroneous character of the basic estimate in Ex. 320.

The witness also estimated the number of camp cars used on the basis of his former estimate in Ex. 320. (Tr. p. 2732.) The rental rate charged for

locomotives and cars was the same as that charged to private contractors (Tr. p. 2728), and as this undoubtedly includes a profit to the company, it is not proper in the construction account.

The reported cost of this project includes so large a proportion of doubtful and uncertain estimates as to be of no value in determining reproduction costs.

CLEVELAND, CINCINNATI, CHICAGO AND ST. LOUIS RAILWAY

Exhibit 354, Evansville, Mt. Carmel and Northern Railroad.—This project comprises the construction of 36.72 miles of new branch line built in 1911. The track was laid by contract, and the ballasting was done by company forces. The contract price for laying skeleton track was \$500 per mile, the company furnishing work-train service and camp equipment. Although this contract price is one of the highest for skeleton tracklaying in the Bureau's files, the total reported cost of this project is 5 per cent less than the Engineering Report price for this line.

The costs were fairly complete on this project, the only estimate being in the amount of \$5,252.87 for framing and placing bridge ties. These costs, like many others presented by the various carriers, have previously been reported to the P. C. C. in different amounts. This is indicative of the uncertainty that exists with respect to the exact amounts properly chargeable to Account 12.

NEW YORK CENTRAL LINES (WEST)

General Comment

Six projects on the New York Central Lines (West) were presented by witness Powell as Exhibits 356 to 361, inclusive. Mr. Powell was not personally familiar with the construction work and his information concerning these projects was secured from the accounting records or from conversation with others.

The amounts set out in the various exhibits are lump-sum totals without details of the expenditures. In order to trace the amounts appearing in the exhibits it was necessary to go through several steps before the constituent items could be identified in the carrier's accounting records. Breakdowns of the costs in four exhibits made by Bureau representatives are in this record as Exhibits 447 to 450, inclusive.

In each of the exhibits, large amounts have been prorated and estimated in order to approximate the amounts properly chargeable to Account 12. Rental of equipment is estimated by applying the operating department's billing rate to a calculated number of days. Items for tools have been included, based upon the ratio which the cost of tools, including hand, motor, and push cars, bore to the total pay-roll labor on the lines west for the period 1910 to 1914. There is, of course, no necessary relation between the percentage developed in this way and the actual cost of this item in any of the jobs.

These projects are varied in character and their outstanding features can best be discussed under each particular job. Attention should, however, be directed to the type of labor items included in the several studies. Very substantial amounts—\$53,000 in one case and \$25,000 in another—bear no description other than "labor unidentified." The Commission certainly can not be expected to accept upon faith the statement that these charges are proper charges to Account 12.

Exhibit 356, Indiana Harbor to Millers.—The nature of the work on this line revision, and the circumstances surrounding the construction have been described in Part II of this brief, where the exceptional character of the project was pointed out.

This reported cost includes all charges for handling material which should properly be found in the material accounts. At first the witness professed complete ignorance as to any details of the manner in which the material was handled. He returned at a later date, however, with additional information which shows that all of the material was unloaded and piled at Pine or at Indiana Harbor, and from there distributed by work train to the site of the work. (Tr. p. 5762.)

The witness, although still believing these charges were proper to Account 12, suggested methods by which the exhibit might be corrected to exclude them. One of his suggestions was that deductions for handling material be made on the basis of estimates used by the Bureau, which, of

course, have no relation to the actual cost of doing this work on this particular job, so that the result of the subtraction may not in any way represent what is proper as the Account 12 charges. As an alternative, he suggested that all costs prior to December 1, 1907, for handling material, plus one-half of the Bureau's material yard estimate, to cover the cost of loading, be deducted, the purpose being to leave remaining in the total the cost of unloading at the site of the work. This involved the assumption that all of the material was reloaded from these piles subsequent to December 1, 1907, and still requires the deduction of theoretical cost from actual cost. (Tr. pp. 5764-5765.)

Here again we have a striking illustration of the failure of the Interveners to make any corrections in their summaries. Although the error in this case is very substantial, no correction was made in the reported cost in the summaries and the erroneous totals find their way into the computations by which the final conclusions are reached.

The reported cost includes charges for installing a crossing with the B. & O. Railroad *outside of the limits of the mileage included in the study*. (Tr. p. 4851.) Another item in connection with the same work is \$667 for raising the B. & O. crossing to final grade. (Tr. p. 4886.) This work was done under operation, and with two operating railroads to look out for the cost is tremendously increased. There is no excuse for including costs in connection

with the B. & O. outside of the project, and this can only have the effect of inflating the total.

Large sums were spent for lifting of track, relining and resurfacing for several months after tracks were placed in operation due to settlement of fills. (Ex. 356.) Because of the manner in which the exhibit is set up the amount so expended after operation can not be determined. These charges are clearly maintenance expenses and have no place in these costs.

Large amounts for "watching ties" are included. (Tr. p. 4875.) This refers to the expense of watchmen at the piles where the ties were unloaded and stored, and there is no certainty that the deductions which the witness suggests are comprehensive enough to completely offset the inclusion of these charges. Another element which helps swell the total cost is the inclusion of substantial sums for work trains used in testing the track for high speed.

Estimates amounting to 3½ per cent of the total cost, or \$3,438, have been included for rental of equipment and use of tools. This computation of rental does not purport to be anything more than an estimate, and there is no way of checking it against the actual cost.

This project is valueless in any case because of the nature of the work and in addition the costs are so inaccurate and erroneous that it must be entirely rejected as cost data.

Exhibit 357, Elyria Junction to Amherst.—This exhibit reports the costs of 6.384 miles of fourth

main track, yard tracks, and a number of cross-overs. Construction took place between May, 1912, and April, 1913, at an average rate of slightly more than one-half mile per month. This construction was adjacent to the heavily operated main line of the New York Central, which at this time was carrying 73 trains a day. In obtaining materials the work train had a haul of 15 or 20 miles over the existing tracks (Tr. p. 4808) so that there is no question but that interference from traffic caused considerable delay.

As on other projects of this carrier, the cost of rental of equipment was not recorded and an estimate had to be resorted to. For this purpose the pay roll of engine crews was divided by the daily average pay roll of all work-train crews in the western division, and for each locomotive day thus derived one caboose day and six work car days were allowed. (Ex. 357, p. 1.) The witness had no information as to the actual number of cars used or the number of days' service which they saw. (Tr. pp. 4825, 4827.) There is no assurance that such average costs represent the actual costs incurred on this job.

Exhibit 358, Franklin to Rose Siding.—This project comprises the construction of 76.705 miles of new line built between September, 1905, and August, 1910. The construction accounts, however, were kept open until the end of 1913.

The total costs set up in the exhibit include an amount of \$18,514.90 which has been transferred

from various other accounts to Account 12 for this study. (Tr. p. 5484.) These transfers were made from very meager information in the accounting records. A large part of the work-train service had been charged to Account 43 and by referring to the descriptions on the monthly statements, the amount shown in the exhibit was picked out. (Tr. p. 5485.) These descriptions are so inadequate as to make an accurate distribution impossible. A very substantial portion of the total cost, \$25,872.05, is included for "unidentified labor." This charge certainly can not be accepted on its face as proper to Account 12, when nothing whatever is known as to the work done. Rental of equipment amounting to \$7,180 has been estimated as the proper Account 12 charge.

There are a number of charges for work after operation began, but the witness could not segregate the amount charged for work on existing tracks subsequent to operation and the amount charged for new construction after that date. (Tr. p. 5488.) Apparently some maintenance after operation is included.

Exhibit 359, Cleveland Short Line.—This project is a belt freight line about 20 miles long around the city of Cleveland. The line was built in two sections of about 10 miles each. Tracklaying on the western portion was begun in November, 1906, about 4 miles of track being laid at that time, and work was then suspended until, May, 1909, when it was resumed and operation on the western half of the new line began in February, 1910. The re-

mainder of the line was built between November, 1911, and July, 1912. However, charges are included in the exhibit up to April 30, 1915. The long delays involved in the construction of this project undoubtedly affect the total cost in a considerable degree and the manner in which the work was done can not be considered comparable to reproduction. There was apparently a large amount of resurfacing required on the track which lay idle about 3 years except for its use as a construction track (Tr. p. 5413), and this would have been obviated if a normal construction program had been followed. There is no justification for using a project such as this as a basis for any conclusions.

On a part of this line slag ballast was first placed and later the slag ballast was taken out and replaced by rock ballast. Charges, the amount of which can not be determined, for digging out and removing the slag ballast are included in the total. (Tr. p. 5437, 5458.) The cost of applying both the slag and the stone are included in the study as well as the quantities of both. (Tr. pp. 5456, 5457.) The exhibit thus reports the cost of placing material which is not in the track and was not there at valuation date. It follows, of course, that any comparison of the reported costs with the engineering report price is impossible because they are on a different basis. On one section of this track in addition to an item for "stripping" there is included \$5,925.01 for relaying the track with stone ballast, which was transferred from Account 6 to

Account 12 because the witness thought that it referred to the placing of ballast on bridges. (Tr. p. 5460.) The manner of constructing this work is, of course, unusual, and improper costs are clearly included so that the data do not offer any indication of what reproduction costs for a similar stretch of track would be.

Included in the total cost is the sum of \$1,756 for taking up and relaying Nickel Plate Railroad tracks. Other items, \$180 and \$215, marked "change lead to Nickel Plate track" (Tr. p. 5435) are also added into the totals. These items are, to say the least, open to question, being apparently maintenance charges, and illustrate the doubt which surrounds the reported costs.

Among the transferred items is an amount of \$4,932 from Account 11 which includes among other charges \$642.76 for "changing tracks." (Tr. p. 5462.) Charges of this nature are proper to operating expenses. There are also a number of transfers from Account 15 to Account 12. Among these is an item of \$3,094 expended for ballasting on one end of the line a year after operation had begun. (Tr. p. 5467.) Some of this charge applied to new tracks but a portion was incurred on tracks which had been under operation for over a year. (Tr. p. 5470.)

The sum of \$8,959.47 is charged to this construction for personal injuries and has been prorated 30% per cent to Account 12 in direct ratio with the

total labor charge. This was done without knowing what the personal injuries were connected with or without knowing whether any of them were incurred in connection with tracklaying work. (Tr. p. 5545.)

Exhibit 360, Chicago, Indiana and Southern Railroad.—This project comprises a total of 157.459 miles of branch line built between June, 1905, and December, 1907. Tracklaying progressed throughout the winter months and charges are admittedly heavy on that account. (Tr. p. 5478.) Little could be learned about this construction except what was shown in the accounting details. (Tr. p. 5479.)

The amount included for work-train service and rental of equipment is \$139,719.71, as compared with the cost of labor laying track of \$138,775.38. That it should cost as much for work-train service distributing material as to lay track appears on its face ridiculous. This work-train service amounts to about \$900 per mile, which is about twice as much as on any of the other 35 New York Central jobs.

The total cost of trackage rights for the project, a substantial amount, has been charged solely to Account 12. The witness could not state what his investigation of this amount disclosed. (Tr. pp. 5491-5492.) There is no assurance that this total charge should be made against tracklaying and surfacing without any proportion of it being made against other accounts.

Reference to Exhibit 441, an analysis made by the Bureau of the very involved records of the carrier, discloses that substantial amounts are included in the total for loading material. Just where this was done or why it should be proper to Account 12 is not known. Some trouble must have been encountered on this job from subsidence because the contractor was paid \$1,500 in December, 1905, for placing extra ballast required by an unusual settlement of a bank. Numerous charges are found in Exhibit No. 449, which from their description may be questioned as being proper in Account 12.

\$2,000 was paid to the contractor as anticipated profits on a portion of the contract which was cancelled. \$440 of this amount had been originally charged to Account 11 (Ex. 449, p. 12), but the whole amount now appears in the reported cost. \$28,491 has been prorated on an estimated basis to Account 12 for camp expenses, tools, supplies, and transportation.

Operation began February 20, 1906, over the whole line. Tracklaying must have been substantially completed at this time, yet \$14,422 for work-train service distributing material is included after that date. What is more significant, however, is that \$53,648.74 is charged for "labor unclassified," after the line was opened for operation. There is no way of determining what work this expenditure covers. It should not be accepted on its face as proper to Account 12, especially when operation

was going on at the time and without any assurance that the whole amount is not maintenance expense.

Exhibit No. 361, Marcy to Brady Lake Junction.—This exhibit presents the costs of tracklaying and surfacing on 37.52 miles of branch line, construction of which started in July, 1906. The work was substantially completed in June, 1910, but operation did not begin until October 15, 1911, and construction charges ran along for another year until December, 1912. (Tr. pp. 3585, 3587.) Between June, 1910, and October, 1911, no use whatever was made of the track. The expense of keeping the roadbed in condition for operation between these two dates went into the construction account and amounted to \$16,835.52. (Tr. p. 3587.) Some of this amount was incurred for intensive surfacing but there is also included an amount for purely maintenance expenses in resurfacing and rehabilitating the tracks, which, if the line had been opened in the normal course of events, would have been charged to operation. There are also substantial charges included in the exhibit for patrolling the track after it was completed and before operation began. (Tr. p. 3670.) The reported cost includes \$18,223 for personal injuries, which is about 25 per cent of the total labor cost. (Tr. p. 3619.) Most of this expense was occasioned by the wreck of a work train on September 13, 1911, about a year after the track had been finished and while it was lying idle awaiting the beginning of

operation. Clearly, this one item alone stamps the costs of this job as abnormal.

The costs of this project illustrate the practice followed by some witnesses of including numerous items which appear on their face questionable, and the accuracy of which can not be verified. Sometimes only the flimsiest of assumptions are behind this inclusion. A number of vouchers for detour service are charged to Account 12, but there is no information whatever to show what work was done for these amounts and the witness could give no positive information on this subject. He assumed that these charges were for getting equipment around a viaduct to the lower end of the work. (Tr. pp. 3632, 3633.) There are included numerous other questionable items such as changing switch targets (Tr. p. 3651) and shipping the household goods of a roadmaster from Cleveland to Chicago. (Tr. p. 3656.) Items are included in the reported cost for "handling material in yards" and pay roll labor "picking up rail along the line" transferred from Accounts 8 and 9 to Account 12, but the witness could not give much information about them. (Tr. pp. 3687-3688.)

The exceptionally long construction period, with its consequent increased expense, coupled with the cost of rehabilitating the track to prepare it for operation after it lay idle for so long, makes this project wholly incomparable to reproduction. In addition the abnormal amount included for personal injuries makes the cost excessive. Witness

Powell in speaking of the Lake Erie & Pittsburgh construction admitted that "it was out of the ordinary." (Tr. p. 2984.)

DELAWARE, LACKAWANNA AND WESTERN RAILROAD

Exhibit 377, Hopatcong to Slateford Junction.

The records for this project were kept only in fragmentary shape. No use could be made of the few original distribution sheets which were in existence. The only data behind the costs reported in this exhibit are the ledger charges, and there is no way of verifying them at the present time.

To the costs as originally recorded there has been added the estimated amount of \$22,111 for rent and repair of equipment and transportation of men, tools, and supplies. The amount estimated in Exhibit 378 for rent and repair of equipment, \$261 per mile, has been directly applied to this job. The cost of transporting men estimated in that case has been applied to this job in direct ratio with the difference in mileage of the two jobs from the labor center, New York City. There was no information available as to the cost of transporting tools and supplies and the \$25 per mile recommended in Formula F was adopted. These estimates are discussed in more detail hereafter with respect to Exhibit No. 378. There is no testimony to show that costs developed on Exhibit No. 378 can properly be applied to this job so that the result may approach the actual cost of these various estimated items.

Exhibit 378, Clarks Summit to Hallstead.—This road is a succession of deep cuts and heavy fills from one end to the other, the cuts in some cases being 100 feet deep and the fills 140 feet high. It was built to eliminate curvature and heavy grades. At Nicholson there is a viaduct one-half mile long and 190 feet high, and another 2,000 feet long at Kingsley. (Tr. pp. 4624-4626.) The construction of these viaducts and a long tunnel delayed the progress of the tracklaying. (Tr. p. 4627.) Other delays were caused by difficulties with property owners who enjoined the company from going on their property to build the track. Most of the right of way had to be condemned. At Hallstead a slight change of line was made to relieve the railroad from the necessity of buying land from property owners who demanded an exorbitant figure. (Tr. pp. 4736-4737.) The character of the country traversed by this project together with the circumstance attending its construction clearly stamp it as unusual.

Records on this project were fairly complete. The time books, pay rolls, and daily work-train reports were available in preparing the cost study. However, these underlying data are in themselves unintelligible and self-contradictory, so that any conclusion to be drawn from an examination of them can be reached only by a process of interpretation and guesswork. To illustrate: On a large number of the daily reports the labor of the men is shown as "loading material," but their time is

shown as having been spent "unloading material," and vice versa. The actual facts can not be determined from the reports, and the best that can be done is to make a guess. There is no certainty that a correct guess was made in any instance.

Tracklaying began in August, 1914, and the work was 90 per cent completed by November, 1915. The whole construction, however, was not finished until December, 1916. Thus it appears that the greater proportion of the work was done after the close of the pricing period, and the higher level of prices is evidenced by the average labor rate which is stated to be 16.23 cents per hour.

The new line was in close proximity to the old track and it was possible to deliver materials and attack the work at several points. Cars of track material were brought by revenue trains to yards at Clarks' Summit, Nicholson, or Hallstead and occasionally to sidings at a few other points. The work-train then picked up these cars of material, and brought them as far as the new track was constructed, where the material was either transferred to the contractor's narrow gauge cars or unloaded on the ground. (Tr. pp. 4722-29.) Although the witness thought this transfer of materials was practically a continuous operation, he did not know how many cars were used on either train, or how many narrow-gauge cars would be required to handle one standard-gauge car of material. (Tr. p. 4748.) A very large number of items for loading material appear in the work-train reports. (Tr. p. 4736.)

From the way in which this material was handled the conclusion must be drawn that many charges which the Bureau ordinarily would include in material yard expense in the material accounts have been charged to Account 12.

But even if it could be established that no charges improper to Account 12 have been included here, nevertheless no comparison of these costs with the Bureau's Account 12 prices can be accurate. The attempt was apparently made in this construction to avoid any expense of handling material in a material yard, and whatever saving was made under this method of construction benefited the material accounts, and the extra expense was charged to Account 12. An examination of the underlying data is persuasive that in the attempt to eliminate all regular material yard charges, Account 12 was burdened with considerable extra cost. To put these costs on a comparable basis with the Bureau's Account 12 price, the latter should be increased by the addition of the Bureau material yard handling costs in Accounts 8, 9, and 10.

The sum of \$30,730.39 has been included as the estimated cost of rental of equipment. The number of cars used in transferring the material in the manner mentioned above was determined from the daily construction train reports and an estimate was made of the time they were held on the work. Some of this work, as we have pointed out above, is of a nature more proper to the material accounts. It follows that the car rental incurred therewith

should also be charged to the material accounts rather than to Account 12. Locomotive rental has been determined from the total number of days during which locomotives were charged on the work train reports to Account 12. However, cross-examination, recorded at pages 4729 to 4753 of the transcript, developed the fact that a great many of the charges made to Account 12 for locomotives in reality cover work which is probably not a proper charge to that account. Some of the reports are self-contradictory, so that there is no way of telling what work was actually done. (Tr. pp. 4741-4742.) Rental of equipment based on such questionable data can not be given very great weight. The estimate made on this project, questionable in nature as it is, has been applied in Exhibit No. 377.

The grading contractors had been required to place sufficient material on the fills to take care of shrinkage, but in some cases the settlement was greater than had been anticipated, and after the skeleton track had been laid it was necessary to add more material to bring the fills up to the theoretical sub-grade. (Tr. p. 4652.) A separate record of costs was kept for this additional material and it was charged to Account 3. The cheapest material available was cinders and this was used. (Tr. p. 4663.) The track had to be blocked up with stones in order to insert this material and after the first layer was placed the track settled again, and it had to be blocked up and brought to the proper level

the second time. (Tr. p. 4669.) This work was described on the daily time books as "grading" and no separation was made between the cost of unloading this material and placing it in the roadbed. (Tr. p. 4678.) An estimate to cover the cost of unloading and distributing it has been deducted from the total and the remainder, \$45,427.55, has been transferred to this exhibit from Account 3 and included in the reported costs. From the description of the work which was performed it seems to be very certain that most of it was the replacement of *grading* material and is a proper charge to Account 3, as first made.

Cost of transportation of men and supplies has been estimated in the amount of \$10,234. No records of the number of men or the amount of supplies transported were available. To arrive at the cost of transporting men, the total labor cost was divided by the labor rate per day to obtain the number of man-days. The *carrier's experience* indicates that the labor turnover averages one man for each 45 man-days. The actual turnover on this job was unknown. The number of men transported was calculated on the basis of this average turnover. To the regular passenger tariff rate from Hoboken, N. J., to Nicholson, Pa., the carrier's operating ratio for the year 1914, 65 per cent, was applied, and the amount of \$2.25 per man calculated as the proper rate to apply in estimating the costs. Transportation of supplies, etc., was estimated on the basis of the \$25 per mile found in Formula F.

Both of these items are at best only guesses and may or may not be close to the actual cost. The estimate for the number of men transported is especially doubtful in the absence of any information as to whether the labor turnover was near the normal amount.

CONCLUSION

The foregoing discussion has summarized the issues in this case and has set forth the position of the Bureau with respect to them. First and foremost, there is the question of principle to be decided; whether the Commission is required to find the cost of reproduction new of a *seasoned* track or of a *new* track. If the Commission adheres to the view heretofore taken both by it and by the courts, it cannot fail to reject the Intervener's theory of the reproduction *new* of an *old* track. Furthermore, acquiescence in the position taken by the Interveners would run counter to the express declaration of the Supreme Court that the cost of reproduction theory must be "reasonably" applied, for we have demonstrated that the reproduction of a seasoned track is neither practicable nor reasonable. If an old track has a greater value than a new one, the proper place to take cognizance of, and report that fact is under the element of *value*, "appreciation" and not under "cost of reproduction new."

There is in addition the secondary question as to the data and conclusions presented by the Interveners. The discussion in this brief has set forth the

unrepresentative character of the data, and the erroneous costs included in the reports, as well as pointed out the fallacies existing in the recommended pricing schedule. No other conclusion is possible, we believe, than the rejection *in toto* of the claims made by the Interveners.

Although the prices for tracklaying and surfacing applied by the Bureau to any carrier other than the Boston and Maine are not in issue, the evidence presented by the Bureau demonstrates that the schedule of prices followed by the Bureau as a guide is adequate, and even liberal, when tested in the light of contract prices generally paid for the work included in Account 12. The contentions so emphatically urged by the Interveners are not sustained upon a critical analysis of the contract data and the argument of counsel in support of their position is extremely tenuous.

Respectfully submitted.

FRED N. OLIVER,
W. J. WALSH,
Attorneys.

CHAS. W. NEEDHAM,
Solicitor.

OLIVER E. SWEET,
Assistant Solicitor.

DECEMBER 27, 1926.

APPENDIX I

List of line changes, additional track work, jobs less than 10 miles, and yard track projects

Ex. No.	Carrier	Project	Character of work
222	N. Y. C. R. R.	Brewster yard.....	Yard tracks, less than 10 miles.
223	do.....	Beaver Dam-Corning.....	Additional track.
224	do.....	Belle Isle Yard.....	Yard track piecemeal construction.
225A	do.....	Brockport-Albion.....	Additional track.
227	do.....	Churchville-E. Buffalo.....	Do.
228	do.....	Cranes Village.....	Line change.
231	do.....	Gardenville Yard.....	Yard track, piecemeal construction.
232	do.....	Goldens Bridge-Brewster.....	Additional track, less than 10 miles.
233	do.....	Hyde Park-Germantown.....	Additional track, 4 separate projects.
234	do.....	Lacona-Adams.....	Additional track, less than 10 miles.
236	do.....	Marble Hill, N. Y.....	Line change, less than 10 miles.
238	do.....	Nepperhan-Ardsley.....	Additional track, less than 10 miles.
240	do.....	Oak Grove (Avis) Yard.....	Yard track, piecemeal construction.
241	do.....	Poughkeepsie-Hyde Park.....	Additional track.
242	do.....	Richmond-Laona, etc.....	Do.
243	do.....	Sanborn-Lockport Jct.....	Additional track, less than 10 miles.
245	do.....	Storm King-Chelsea.....	Additional track.
246	do.....	Syracuse Jct.-Churchville.....	Do.
247A	do.....	Thompson-Dresden.....	Do.
248	do.....	Utica-Slittville.....	Do.
249	do.....	Utica Yard.....	Yard track, piecemeal construction.
251	do.....	White Plains-Mt. Kisco.....	Additional track.
253	H. V.....	Lancaster-Enterprise.....	Do.
264	do.....	Kimberly-Beaumont.....	Additional track, less than 10 miles.
270	B. & L. E.....	Ford Branch No. 3.....	Less than 10 miles.
271	do.....	Kremis-K. C. Junction.....	Do.
272	do.....	Mercer Jct.-Coolspring.....	Do.
273	E. J. & E.....	Rockdale Jct.-Rockdale.....	Do.
282	C. R. R. N. J.....	Bowentown-Bridgeton.....	Do.
286	B. & O.....	North Fork Branch.....	Do.
291	P. R. R.....	Bristol.....	Line change.
293	do.....	Duncannon-Aqueduct.....	Do.
295	do.....	Granville Br.-Mayes Br.....	Do.
296	do.....	Newfield-Atlantic City.....	Additional track.
297	do.....	Northumberland.....	Yard track.
298	do.....	Pitcairn-Trafford.....	Do.
299	do.....	Cape Jct.-Kiptopeke.....	Less than 10 miles.
300	do.....	Possuin Glory Branch.....	Do.

(326)

List of line changes, additional track work, jobs less than 10 miles, and yard track projects—Continued

Ex. No.	Carrier	Project	Character of work
301	B. & L. E.....	Carlisle-Greaseon.....	Line change.
304	Erie.....	Uniondale-Simpson.....	Additional track, less than 10 miles.
305	Reading.....	Cheltenham-Neshaminy Falls.....	Line change.
356M	N. Y. C.....	Indiana Harbor-Millers, main track.	Do.
356S	do.....	Indiana Harbor-Millers, side track.	Additional track, less than 10 miles.
357M	do.....	Elyria Jct.-Amherst, main track.	
357S	do.....	Elyria Jct.-Amherst, side track.	

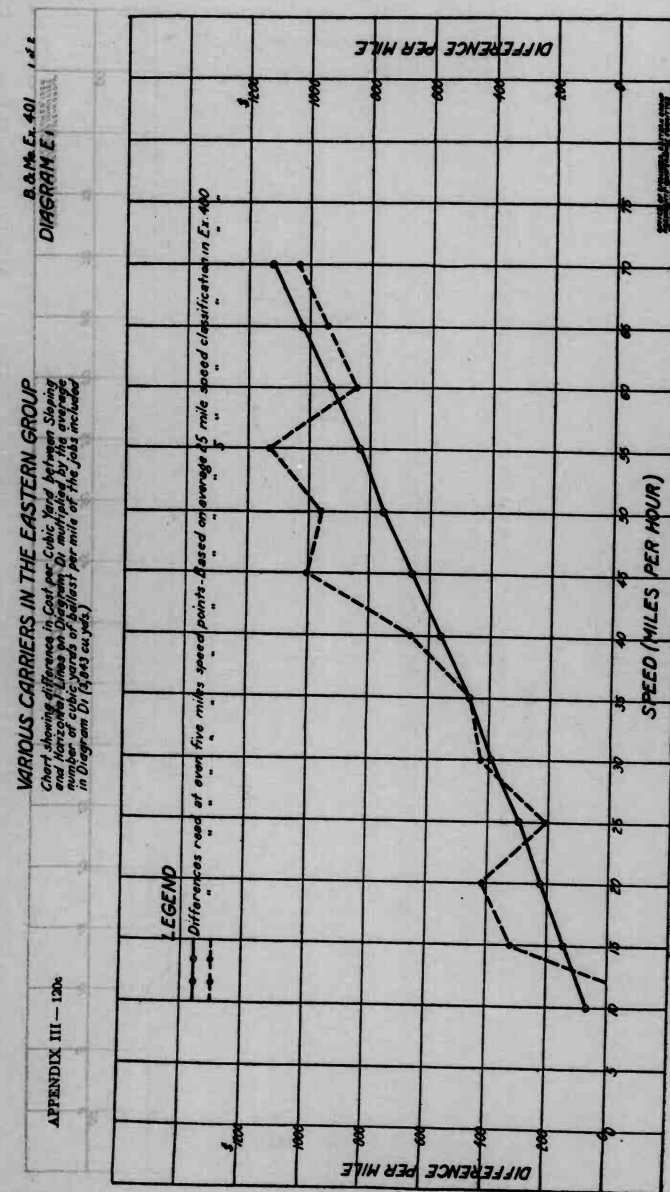
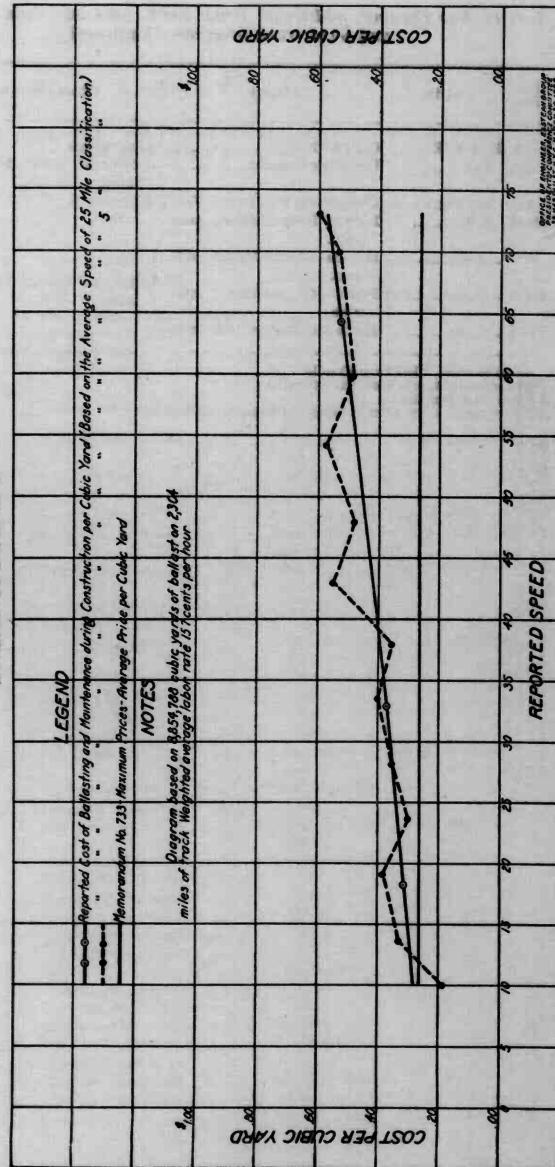
8 line changes, 1 less than 10 miles.
20 additional track, 8 less than 10 miles.
8 less than 10 miles.
7 yard track, 1 less than 10 miles, 4 piecemeal construction

APPENDIX 11 - 1206

VARIOUS CARRIERS IN THE EASTERN GROUP
CHART SHOWING WEIGHTED AVERAGE REPORTED COST
OF
BALLASTING AND MAINTENANCE DURING CONSTRUCTION
AT REPORTED LABOR RATE

B & M Ex. 400
DIAGRAM D1

1 of 10



This book is due on the date indicated below, or at the expiration of a definite period after the date of borrowing, as provided by the rules of the Library or by special arrangement with the Librarian in charge.

DATE BORROWED	DATE DUE	DATE BORROWED	DATE DUE
C28/638/M60			

C2B(638) M50

MSH 01207

COLUMBIA UNIVERSITY LIBRARIES



0041407806

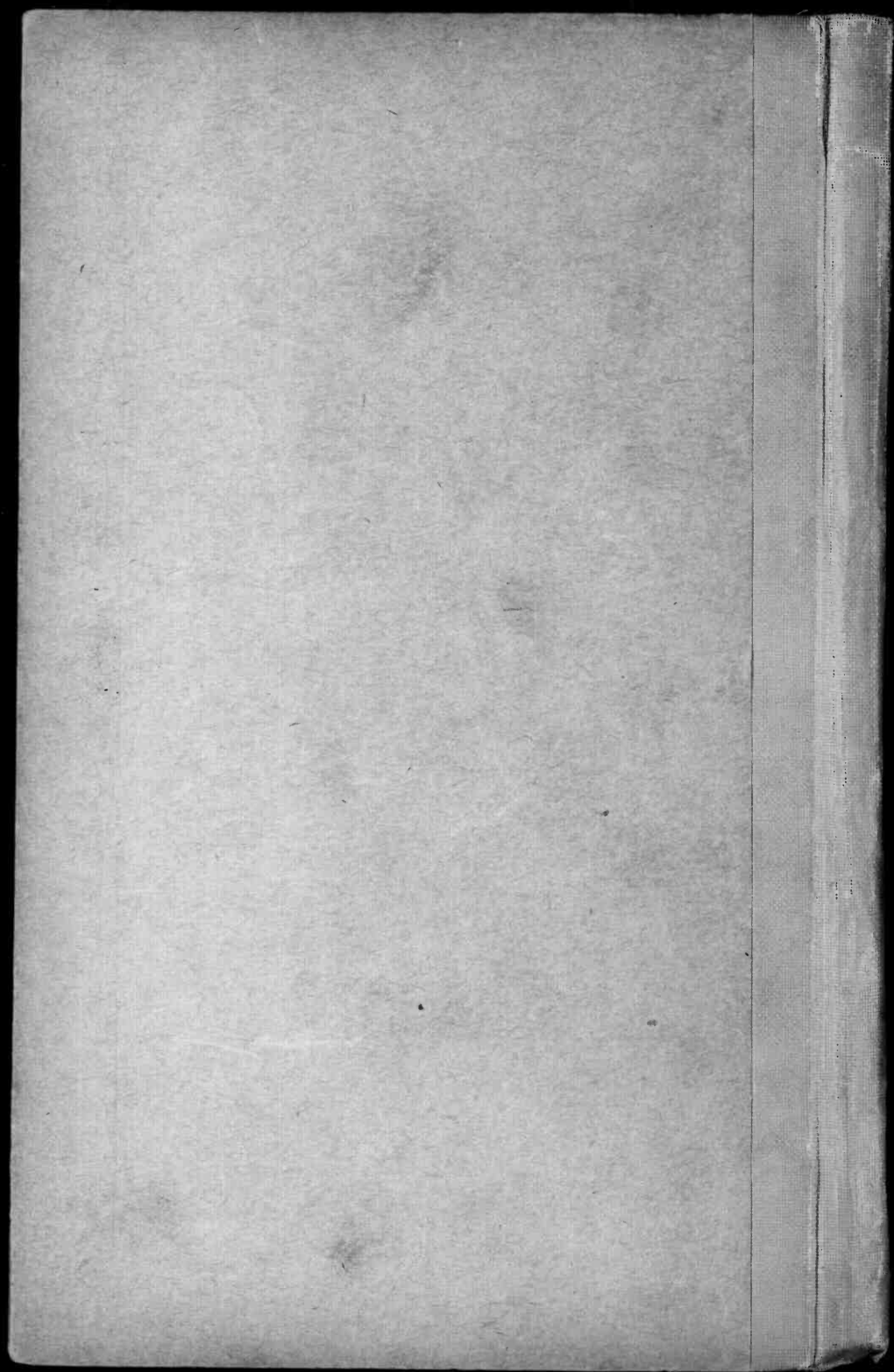
530.7

Ln 343

U.S.I.I.C.

Valuation docket ...

MAY 12 1938



**END OF
TITLE**